



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : C07D 241/52, 241/44, 405/12, 417/12, 401/12, 403/12, 413/12, A61K 31/495</p>	<p>A1</p>	<p>(11) International Publication Number: WO 95/09159 (43) International Publication Date: 6 April 1995 (06.04.95)</p>
<p>(21) International Application Number: PCT/JP94/01559 (22) International Filing Date: 22 September 1994 (22.09.94) (30) Priority Data: 5/241140 28 September 1993 (28.09.93) JP 6/114639 28 April 1994 (28.04.94) JP (71) Applicant (for all designated States except US): OTSUKA PHARMACEUTICAL COMPANY, LIMITED [JP/JP]; 9, Kandatsukasa-cho 2-chome, Chiyoda-ku, Tokyo 101 (JP). (72) Inventors; and (75) Inventors/Applicants (for US only): KOMATSU, Makoto [JP/JP]; 91-5, Sasagino-Aza-Hachiyamakaitaku, Matsushige-cho, Itano-gun, Tokushima 771-02 (JP). SATO, Hideaki [JP/JP]; ST-Guran-Naruto 503, 151, Kokuwajima- Aza-Machama, Muya-cho, Naruto-shi, Tokushima 772 (JP). TAIRA, Shimichi [JP/JP]; Ediitaun-Gomaihana B-5, 188, Tateiwa-Aza-Gomai, Muya-cho, Naruto-shi, Tokushima 772 (JP). MIYAKE, Masahiro [JP/JP]; Masters-L-Kitajima 17-102, 1, Kitamura-Aza-Kamiyashiki, Kitajima-cho, Itano- gun, Tokushima 771-02 (JP). MAGATA, Kiyohiko [JP/JP]; 39-8, Nakakirai-Aza-Nakasenishinokoshi, Matsushige-cho, Itano-gun, Tokushima 771-02 (JP). YOSHIDA, Hidehiro [JP/JP]; 304-4, Hashimoto, Hachiman-cho, Tokushima-</p>		<p>shi, Tokushima 770 (JP). UYEYAMA, Atsunori [JP/JP]; Gurandoru-Kitasako 403, 4-46, Kitasakoichiban-cho, Tokushima-shi, Tokushima 770 (JP). NISHI, Takao [JP/JP]; 2-28, Tarohachizu-Aza-Sotobiraki, Kitajima-cho, Itano-gun, Tokushima 771-02 (JP). (74) Agents: AOYAMA, Tamotsu et al.; Aoyama & Partners, IMP Building, 3-7, Shiromi 1-chome, Chuo-ku, Osaka-shi, Osaka 540 (JP). (81) Designated States: AU, CA, CN, KR, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.</p>
<p>(54) Title: QUINOXALINE DERIVATIVE AS ANTIDIABETIC AGENT</p>		
<div style="text-align: center;"> <p>(1)</p> </div>		
<p>(57) Abstract</p> <p>Quinoxaline derivatives of formula (1), and salts thereof, which have excellent antidiabetic activity, and an antidiabetic agent comprising as an active ingredient the quinoxaline derivative or a pharmaceutically acceptable salt thereof.</p>		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

- 1 -

DESCRIPTION

QUINOXALINE DERIVATIVE AS ANTIDIABETIC AGENT

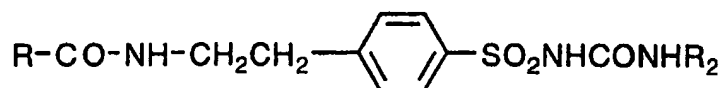
Technical Field

5 The present invention relates to an antidiabetic agent.

Background Art

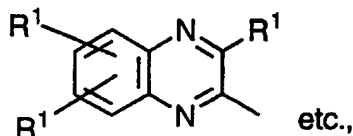
Various quinoxaline derivatives have been known. For example, BE-764998 (= JP-A-46-4377) discloses that the following sulfonylureas are useful as hypoglycemic agents.

10



wherein R is a group of the formula:

15

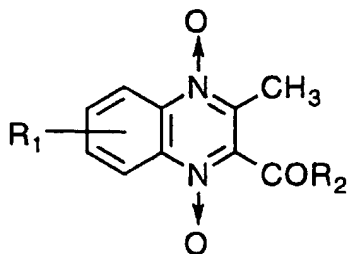


and R₂ is alkyl, alkenyl, cycloalkyl, etc. Said compounds are similar to the compounds of this invention in the basic structure and also in the pharmacological activity but are distinguished from the compounds of this invention in the substituent on the phenyl ring in the substituent -CONR³R⁴ at 2 - position of quinoxaline ring.

20

DD-273254-A discloses selective reduction of quinoxaline-di-N - oxide derivatives of the formula:

25

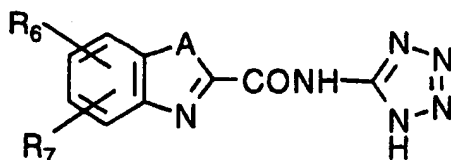


wherein R₁ is H, Cl, methyl, or methoxy, and R₂ is OH, alkoxy or β - hydroxyethylamino, to give the corresponding N-4-monoxides which are useful as an intermediate for pharmaceuticals and pesticides.

30

DT-2410852 (= JP-A-50-29583) discloses N-tetrazolyl - quinoxaline-2-carboxamides of the formula:

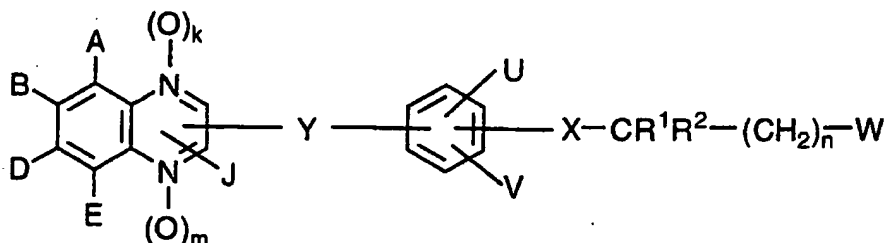
- 2 -



5 wherein A is $-N=CR_2-$ etc., R_2 is H, halogen, alkyl, OR_3 , NR_4R_5 , etc., and R_6 and R_7 are H, halogen, alkyl, OR_3 , NR_4R_5 , etc., which are useful for treating disorders such as asthma, hay-fever, urticaria, eczema or atopic dermatitis.

EP-23785 discloses substituted alkoxy-phenoxy-quinoxaline(s), N - oxide(s) thereof of the formula:

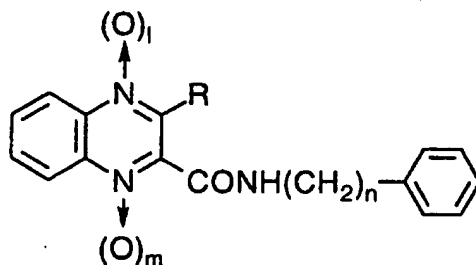
10



15 wherein A, B, D, E, J, U and V are H, halogen, nitro, CN, amino, mono- or di - substituted amino, alkyl, alkoxy, carbamoyl, etc.; Y and X are O or S; R^1 and R^2 are H, alkyl, alkenyl, etc.; and W is CN, $CSNH_2$, etc., which are useful as pre- and post-emergence selective herbicides. EP-26622 discloses also similar quinoxaliny-alkoxy-phenoxyalkanoic acids which are useful as pre- and post -
20 emergence selective herbicides.

Heterocycles, Vol. 26, No. 3, 1987, pp. 699-711 discloses substituted 2-quinoxalinecarboxamides and their N-oxides of the formula:

25

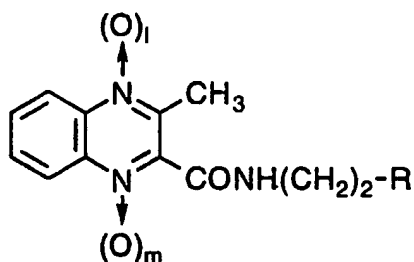


30 wherein R is H or methyl, n is 0 or an integer of 1 to 4, l and m are 0 or 1, but no pharmacological activity of these compound is mentioned.

J. Chem. Eng. Data, vol. 29, No. 2, pp. 229-231 (1984) discloses quinoxaline compounds of the formula:

- 3 -

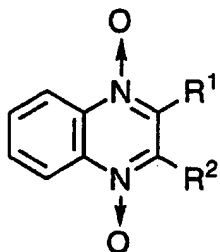
5



wherein l and m are 0 or 1, and R is 2-imidazolyl, 3-indolyl, etc. which have antibacterial activity.

DD-284585-A discloses quinoxaline-1,4-di-N-oxides of the formula:

10

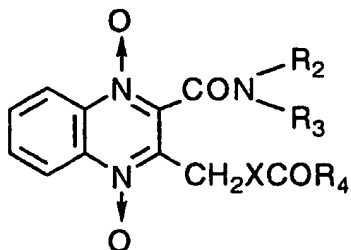


15

wherein R^1 is H or optionally substituted alkyl, and R^2 is H, optionally substituted alkyl, or hydroxyethylcarbamoyl, which are useful as a medicinal feedstuff to protect piglets from gastro-intestinal disorders.

BE-721725 discloses 3-carboxamidoquinoxaline-di-N-(1,4) - oxides of the formula:

20



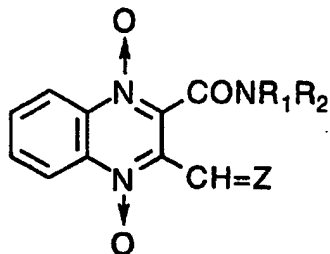
25

wherein R_1 is H, alkyl, alkoxy, or Cl; R_2 and R_3 are H, optionally substituted alkyl, or may form with N a 5- or 6- membered heterocyclic ring; X is O or S; and R_4 is optionally substituted alkyl or optionally substituted phenyl, which have antibacterial activity. Similar compounds are also disclosed in many literatures such as BE-721726, BE-721728, BE-738246, BE-742970, DT-2012743, NL - 7305048, BE-846532, GB-1308370, JP-B-46-23264, JP-B-45-24988, and JP-B - 45-24989.

30

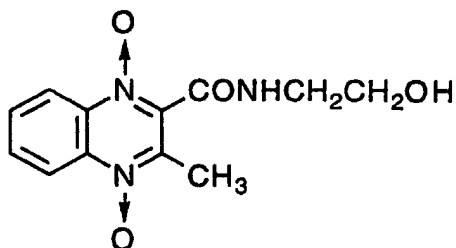
- 4 -

NL-7206031 discloses 2-formyl-3-carbamoyl-quinoxaline 1,4-dioxides of the formula:



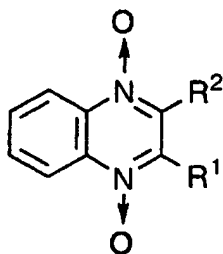
wherein R_1 and R_2 are H, optionally substituted aliphatic or cycloaliphatic group, or form a 5- to 7-membered ring optionally containing O or S, Z is NOH or NNHC(Y) R_3 , which have antimicrobial activity. Similar compounds are also disclosed in many literatures such as BE-856771, DT-2639429, DT-2656783, EP-1618, EP-73390, DE-3230273-A, BE-824065, DT-2501492, BE-828745, US-3948911, US-4039540, DD-268127, DD-268942-A, JP-A-62-120371, JP-A - 62-123178, EP-288628-A, JP-A-60-120815, BE-856771, and BE-753582.

DE-3324908-A discloses 2-(N-(2-hydroxyethyl)carbamoyl)-3-methylquinoxaline 1,4-di-N-oxide of the formula:



which is useful as animal growth promoters. Similar compounds are also disclosed in other many literatures such as EP-142093-A, DT-2907174, JP-A - 50-082217, GB-2038824, JP-A-62-174061, and JP-A-62-149670.

NL-7206601 discloses 2,3-disubstituted quinoxaline-1,4-dioxides of the formula:

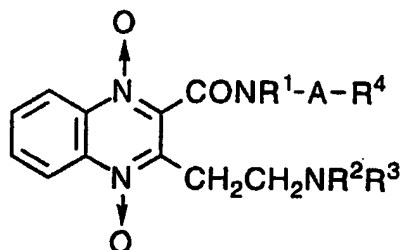


wherein R^1 is phenyl optionally substituted by alkyl, alkoxy, halogen or CF_3 , and R^2 is $-CONR^3R^4$ where R^3 and R^4 are H or alkyl or form together alkylene

- 5 -

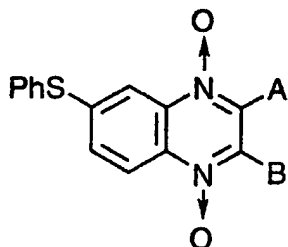
optionally containing O, S or N heteroatom, which are useful as bactericides and amoebicides. Similar compounds are also disclosed in BE-763377, DT - 2228802, and BE-904482.

EP-12725 discloses quinoxaline di-N-oxides of the formula:



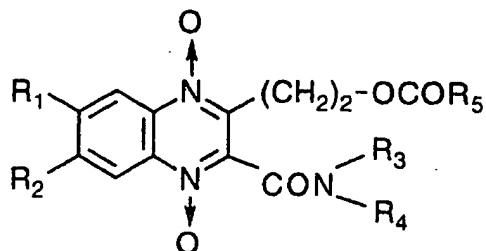
wherein R¹ is H or alkyl; R² and R³ are alkyl or NR²R³ forms 4-5C heterocyclic ring optionally substituted by alkyl, and R⁴ is H, methoxy, methylthio, OH, F, Cl, Br or CN, which are useful as broad-spectrum antimicrobial agents, esp. as veterinary medicaments, and animal growth promoters. Similar compounds are also disclosed in DT-2701707.

CH-619456 discloses 6-phenylthio-quinoxaline-1,4-dioxide derivatives of the formula:



wherein one of A and B is methyl, and the other is -CONHCH₂CH₂OH, which are useful as animal growth stimulants. Similar compounds are also disclosed in CH-619457 and CH-630908.

DT-2052359 discloses quinoxaline 1,4-dioxides of the formula:

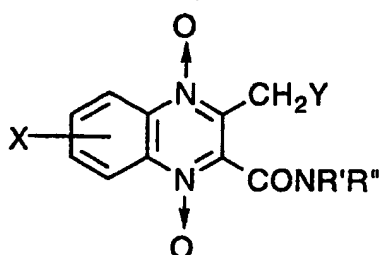


wherein R₁ and R₂ are each H, alkyl or alkoxy, or form together methylenedioxy; R₃ is H, optionally unsaturated aliphatic residue (optionally substituted by CN, COOH, carbamoyl, alkylamino, etc.), a 5- or 6-membered

- 6 -

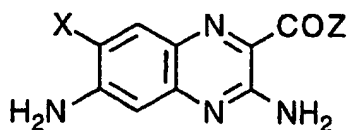
cycloaliphatic residue (optionally substituted by alkyl), arylalkyl or furfuryl; R_4 is H, or NR_3R_4 is optionally unsaturated 5- or 6-membered heterocyclic ring optionally substituted by alkyl; and R_5 is optionally substituted and optionally unsaturated aliphatic, cycloaliphatic, araliphatic aromatic or heterocyclic residue, which have antiprotozoal and antibacterial activity. Similar compounds are also disclosed in DT-2052279.

DT-2120501 discloses 3-substituted quinoxaline-2-carboxamido - 1,4-dioxides of the formula:



wherein X is H, methyl, methoxy, CF_3 , F, Cl, or Br; Y is alkylthio, alkylsulfinyl, or alkylsulfonyl; R' is H or alkyl; and R'' is H or alkyl optionally substituted by amino alkylamino, dialkylamino, pyrrolidino, piperidino, etc., which are useful as broad spectrum antibacterial agents, growth stimulants especially for pigs and poultry. Similar compounds are also disclosed in BE-764088, BE-773396, and DT-2212932.

US-3185688 discloses quinoxaline derivatives of the formula:

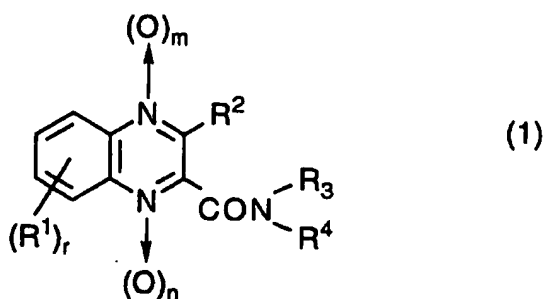


wherein Z is $NR(CH_2)_nNR_1R_2$, $NR(CH_2)_nOalkyl$, $NR(CH_2)_nSalkyl$; X and R are H or alkyl; R_1 and R_2 are alkyl, or NR_1R_2 is morpholino, piperidino, pyrrolidino; and n is 2 - 4, which are useful as tranquilizers. Similar compounds are also disclosed in US-3192212 and FR-2211006.

Disclosure of Invention

The antidiabetic agent of the present invention comprises as an active ingredient at least one of quinoxaline derivatives of the formula (1):

- 7 -



wherein R^1 is hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent,

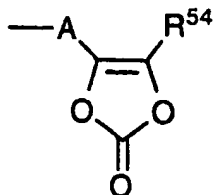
R^2 is hydrogen atom, a lower alkyl group having optionally a halogen substituent, phenyl group, a morpholino-substituted lower alkyl group or an imidazolyl-substituted lower alkyl group,

n and m are each 0 or 1,

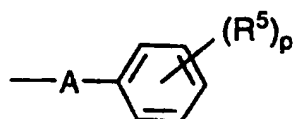
r is 1 or 2,

R^3 and R^4 are the same or different and each a) hydrogen atom; b) a lower alkyl group; c) a phenyl-lower alkoxy carbonyl group; d) a lower alkanoyloxy-substituted lower alkyl group; e) a lower alkanoyl group; f) a lower alkoxy carbonyl group; g) a lower alkoxy-lower alkyl group; h) a phenoxy carbonyl group; i) a lower alkanoyl-substituted lower alkyl group; j) a lower alkoxy carbonyloxy-substituted lower alkyl group; k) a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; l) a group of the formula: $-E-N(R^{52})(R^{53})$ (in which R^{52} and R^{53} are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxy carbonyl group or phenyl group, or R^{52} and R^{53} may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: $-\text{CO}-$, or a group of the formula: $-\text{CO}-\text{A}-$ (in which A is a lower alkylene group)); m) a group of the formula:

- 8 -



- 5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); n) a group of the formula:



- 10 (in which A is the same as defined above, p is an integer of 1 to 3, R^5 is hydrogen atom, a lower alkoxy-substituted lower alkoxy group, a lower alkoxy group, an amino group having optionally a lower alkyl substituent, a halogen atom, nitro group, hydroxy group, a lower alkyl group having optionally a hydroxy substituent, a lower alkenyloxy group, a carboxyl-substituted lower alkoxy group, a lower alkoxy carbonyl-substituted lower alkoxy group, a lower alkoxy carbonyl group, a halogen-substituted lower alkoxy group, a hydroxy -
- 15 substituted lower alkoxy group, a phenyl-lower alkoxy group having optionally a substituent selected from a lower alkyl group and a lower alkoxy group on the phenyl moiety, a 1,3-dioxolanyl group having optionally a lower alkyl
- 20 substituent, a lower alkanoyl group, a morpholino-substituted lower alkoxy group, a morpholino-substituted lower alkyl group, a morpholinocarbonyl group or a group of the formula: $-Y-A_1-CONR^6R^7$ (in which A_1 is a lower alkylene group, Y is a group of the formula: $-O-$ or a group of the formula: $-NH-$, R^6 and R^7 are the same or different and each hydrogen atom, a lower alkyl group
- 25 having optionally a hydroxy substituent, a phenyl-lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, a furyl-substituted lower alkyl group, or a lower alkoxy-substituted lower alkyl group, or R^6 and R^7 may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being
- 30 intervened with nitrogen atom or oxygen atom, said heterocyclic group having optionally 1 to 3 substituents selected from hydroxy group, a lower alkyl group and a phenyl-lower alkyl group)); o) a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an

- 9 -

amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: -O -

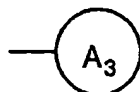
5 $A_4\text{-CO-NR}^{40}\text{R}^{41}$ (in which A_4 is a lower alkylene group, R^{40} and R^{41} are the same or different and each hydrogen atom or a lower alkyl group, or R^{40} and R^{41} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy

10 group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; p) an alkenyl group; q) a cycloalkyl-lower alkyl group; r) a naphthyl-lower alkyl group; s) a phenylthio-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; t) a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy

15 substituent on the phenyl moiety; u) a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; v) a phenoxy-substituted lower alkyl group; w) a group of the formula:



(in which q is an integer of 1 to 3, a group of the formula:

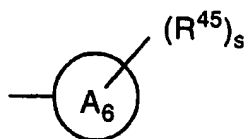


25 is a lower alkyl group substituted by a 5- to 14-membered saturated or unsaturated heteromonocyclic, heterobicyclic or heterotricyclic group having 1 to 4 heteroatoms selected from nitrogen atom, oxygen atom and sulfur atom, R^8 substitutes on the above heterocyclic group, and is hydrogen atom, oxo group, a lower alkyl group having optionally a hydroxy substituent, a halogen atom, nitro group, a lower alkoxy group, cyano group, a lower alkoxy carbonyl group,

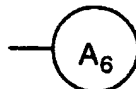
30 a phenyl-lower alkoxy group having optionally an amino group having optionally a lower alkanoyl substituent on the phenyl moiety, a carboxyl - substituted lower alkoxy group, carboxyl group, a lower alkoxy carbonyl - substituted lower alkoxy group, hydroxy group, a lower alkoxy-substituted lower

- 10 -

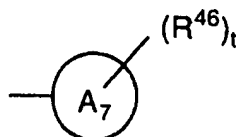
alkoxy group, a lower alkenyloxy group, a lower alkanoyloxy-substituted lower alkyl group, a halogen-substituted lower alkyl group, a lower alkanoyl group, a phenyl group having optionally a substituent selected from a lower alkyl group, a lower alkoxy-substituted lower alkoxy group, hydroxy group, a halogen atom and a lower alkoxy group on the phenyl moiety, a lower alkenyl group, a morpholinocarbonyl-lower alkoxy group, a lower alkylsulfinyl group, an amino-substituted lower alkyl group having optionally a substituent selected from a lower alkylsulfonyl group and a lower alkanoyl group, a lower alkylthio group, a lower alkylsulfonyl group, a lower alkanoyloxy group, a 1,3-dioxolanyl-substituted lower alkyl group having optionally a lower alkyl substituent, a lower alkanoyl-substituted lower alkyl group, an aminocarbonyl-substituted lower alkyl group having optionally a lower alkyl substituent, a lower alkoxy-carbonyl-substituted lower alkenyl group, an aminocarbonyl-substituted lower alkenyl group having optionally a lower alkyl substituent, a carboxyl-substituted lower alkenyl group, benzoyl group, a lower alkoxy-lower alkyl group, a group of the formula:



(in which s is an integer of 1 to 3, a group of the formula:



is a 5- to 6-membered saturated or unsaturated heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R^{45} bonds to said heterocyclic group and is hydrogen atom, a lower alkyl group, a lower alkoxy-substituted lower alkyl group, phenyl group or oxo group), a group of the formula:

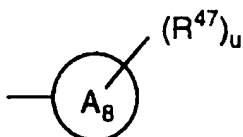


(in which t is an integer of 1 to 3, a group of the formula:

- 11 -

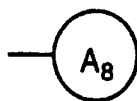


is a lower alkyl group substituted by a 5- to 6-membered saturated or unsaturated heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R^{46} bonds to said heterocyclic group and is hydrogen atom, a lower alkyl group or oxo group), or a group of the formula: $-(C=O)_lNR^9R^{10}$ (in which l is 0 or 1, R^9 and R^{10} are the same or different and each hydrogen atom, a lower alkanoyl group, a lower alkyl group, a morpholinocarbonyl-lower alkyl group, a cycloalkylcarbonyl group, a phenyl-lower alkenylcarbonyl group, a lower alkylsulfonyl group, an aminocarbonyl group having optionally a lower alkyl substituent, a phenylsulfonyl group having optionally a lower alkyl substituent on the phenyl moiety, a phenyl-lower alkenyl group, a benzoyl group having optionally 1 to 3 substituents selected from a halogen atom, a lower alkoxy group, an amino group having optionally a lower alkanoyl substituent and hydroxy group on the phenyl moiety, an amino-substituted lower alkanoyl group having optionally a lower alkanoyl substituent, an amino-substituted sulfonyl group having optionally a lower alkyl substituent, a phenyl-lower alkyl group, phenyl group, or an amino group having optionally a lower alkanoyl substituent, or R^9 and R^{10} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom)); x) a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 is a lower alkylene group, R^{42} and R^{43} combine together to form a group of the formula: $=O$, or $=N-OH$ or a lower alkylendioxy group, and R^{44} is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); y) a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring; or z) a group of the formula:



(in which u is an integer of 1 to 3, a group of the formula:

- 12 -



is a lower alkenyl group substituted by a 5- to 14-membered saturated or
 5 unsaturated, heteromonocyclic, heterobicyclic or heterotricyclic group having 1
 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom,
 R^{47} bonds on said heterocyclic group and is hydrogen atom, a halogen -
 substituted lower alkyl group, oxo group, a halogen atom, a lower alkoxy group,
 a lower alkyl group, a lower alkoxycarbonyl group, carboxyl group, an
 10 aminocarbonyl group having optionally a lower alkyl substituent, an amino
 group having optionally a lower alkanoyl substituent, a phenyl group having
 optionally a substituent selected from a lower alkoxy group and a halogen atom
 on the phenyl moiety, or a group of the formula:



(in which A_6 , R^{45} and s are the same as defined above)),

or R^3 and R^4 may combine together with the adjacent nitrogen atom to
 which they bond to form 1,2,3,4-tetrahydroisoquinolyl group, said heterocyclic
 20 group having optionally a lower alkoxy substituent,
 or a salt thereof.

The present invention provides also novel quinoxaline derivatives
 of the formula (1) as described above wherein all the symbols are the same as
 defined above except that n is 0 and the group R^5 excludes hydrogen atom and
 25 further provided that when R^1 is hydrogen atom, R^2 is methyl group, R^3 is
 hydrogen atom, and m is 0, then R^4 is not 2-(imidazol-2-yl)ethyl, 2-(indol-3 -
 yl)ethyl, or sec-butyl,
 and a salt thereof.

30 According to the diseases determination by WHO, diabetes is
 caused by the absolute lack of the secretion of insulin and arises either acutely
 or subacutely, and includes, insulin dependent diabetes mellitus (IDDM) which
 requires the insulin-treatment, non insulin dependent diabetes mellitus
 (NIDDM) which does not always require insulin-treatment, malnutrition-related

- 13 -

diabetes mellitus (MRDM), other complications accompanied with other diseases.

Among the above, a cause of IDDM is estimated to be the destruction of pancreatis β -cells by auto-immune system. The pancreatis β -cells are considered to be destroyed by HLA antigen, cytokine virus, etc. (cf. Koji NAKANISHI, Tetsuro KOBAYASHI, Mitsuru HARA; Tonyobyogaku (Diabetology) 1989: edited by Mikinori KOSAKA, Yasuo AKANUMA, Shindan-to-Chiryō sha, 1989, pages 226-244). On the other hand, the cause of NIDDM is estimated to be (i) congenital anomaly in pancreatin, i.e. anomaly in adaptability to the increase in insulin consumption, or (ii) disorder in insulin activity induced by various factors such as aging, obesity, stress, etc. (Hiroo IMURA; Tonyobyogaku-no-Shinpo (Progress in Diabetology) 1989, No. 23, edited by Japan Diabetology Association, Shindan-to-Chiryō sha, 1989, pages 1 to 12).

However, the crisis of diabetes is not simple but happens in complicated situation, such as hereditary factors, environmental factors, etc., and it has not been clarified yet.

In viewpoint of the tissue of the patient of NIDDM, the important causes of hyperglycemia is considered to be the decrease in the uptake of glucose at the peripheral tissue, especially at the muscle, and the increase in glucose secretion at the liver. Hitherto, the most common drug therapy for diabetes is treatment with insulin or sulfonylurea agent (agent for promotion of insulin secretion), which are both based on the supplement of insulin, but these treatment have difficulty in strict blood glucose level control, and sometimes they induce hyperinsulin serum or hypoglycemia. Accordingly, it has been considered that a compound which promotes the uptake of glucose at the muscle without promoting the secretion of insulin would be a new kind of hypoglycemic agent without hyperinsulinism nor hypoglycemia and would be useful for treatment of diabetes.

The quinoxaline derivatives of the above formula (1) and salts thereof (hereinafter referred to as the compounds of the present invention) promote the uptake of 2-deoxyglucose (2DG) against L6 cells, cell line of rat

- 14 -

striated muscle (muscular cells) and also promote the consumption of glucose by which they show hypoglycemic activity. Especially, the compounds of the present invention show hypoglycemic activity in db/db mice and KK-Ay mice, which are diabetic animal model (L. Herberg, D.L. Coleman: Metabolism, vol. 26, No. 1 (January), 1977, pp. 59-99). The compounds of the present invention promote the uptake of glucose at the muscle and do not affect the insulin secretion and the glucose release at the liver so that they do not show acute hypoglycemic activity and do not affect oral glucose tolerance test.

Accordingly, the antidiabetic agent of the present invention is useful for treatment of diabetes and diabetic complications such as diabetic blood vessel disorder, diabetic retinopathy, diabetic nephropathy, diabetic neuropathy, etc.

Each group in the above formula (1) specially means the following groups.

The lower alkyl group includes a straight chain or branched chain alkyl group having 1 to 6 carbon atoms such as methyl, ethyl, propyl, isopropyl, butyl, tert-butyl, pentyl, hexyl, etc.

The halogen atom is fluorine atom, chlorine atom, bromine atom or iodine atom.

The lower alkyl group having optionally a halogen substituent includes, for example, in addition to the above mentioned lower alkyl groups, a straight chain or branched chain alkyl group having 1 to 6 carbon atoms having optionally 1 to 3 halogen substituents, such as trifluoromethyl, trichloromethyl, chloromethyl, bromomethyl, fluoromethyl, iodomethyl, difluoromethyl, dibromo - methyl, 2-chloroethyl, 2,2,2-trifluoroethyl, 2,2,2-trichloroethyl, 3-chloropropyl, 2,3-dichloropropyl, 4,4,4-trichlorobutyl, 4-fluorobutyl, 5-chloropentyl, 3-chloro-2 - methylpropyl, 5-bromohexyl, 5,6-dichlorohexyl, 5-bromohexyl, 5,6-dichloro - hexyl, etc.

The morpholino-substituted lower alkyl group includes a morpholino-substituted alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, morpholinomethyl, 2-morpholinoethyl, 1-morpholinoethyl, 3-(2-morpholinyl) - propyl, 4-(3-morpholinyl)butyl, 1,1-dimethyl-2-(2-morpholinyl)ethyl, 5-

- 15 -

morpholinopentyl, 6-morpholinohexyl, 2-methyl-3-morpholinopropyl, etc.

The imidazolyl-substituted lower alkyl group includes an imidazolyl-substituted alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, (1 -
5 imidazolyl)methyl, 2-(1-imidazolyl)ethyl, 1-(2-imidazolyl)ethyl, 3-(4-imidazolyl) - propyl, 4-(5-imidazolyl)butyl, 1,1-dimethyl-2-(2-imidazolyl)ethyl, 5-(4 - imidazolyl)pentyl, 6-(1-imidazolyl)hexyl, 2-methyl-3-(1-imidazolyl)propyl, etc.

The lower alkylene group includes a straight chain or branched chain alkylene group having 1 to 6 carbon atoms, for example, methylene,
10 ethylene, trimethylene, 2-methyltrimethylene, 2,2-dimethyltrimethylene, 1 - methyltrimethylene, methylmethylene, ethylmethylene, tetramethylene, pentamethylene, hexamethylene, etc.

The lower alkoxy group includes a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, for example, methoxy, ethoxy,
15 propoxy, isopropoxy, butoxy, tert-butoxy, pentyloxy, hexyloxy, etc.

The amino group being optionally substituted by a lower alkyl group includes an amino group which may optionally be substituted by 1 to 2 substituents of a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, amino, methylamino, ethylamino, propylamino,
20 isopropylamino, butylamino, tert-butylamino, pentylamino, hexylamino, dimethylamino, diethylamino, dipropylamino, dibutylamino, dipentylamino, dihexylamino, N-methyl-N-ethylamino, N-ethyl-N-propylamino, N-methyl-N - butylamino, N-methyl-N-hexylamino, and the like.

The lower alkyl group having optionally a hydroxy substituent
25 includes a straight chain or branched chain alkyl group having 1 to 6 carbon atoms which may optionally have 1 to 3 hydroxy substituents, for example, hydroxymethyl, 2-hydroxyethyl, 1-hydroxyethyl, 1-hydroxyisopropyl, 3-hydroxy - propyl, 2,3-dihydroxypropyl, 4-hydroxybutyl, 1,1-dimethyl-2-hydroxyethyl, 5,5,4 - trihydroxypentyl, 5-hydroxypentyl, 6-hydroxyhexyl, 2-methyl-3-hydroxypropyl,
30 2,3-dihydroxyethyl, 3,4-dihydroxybutyl, 5,6-dihydroxyhexyl, and the like.

The lower alkenyloxy group includes a straight chain or branched chain alkenyloxy group having 2 to 6 carbon atoms, for example, allyloxy, 2 - butenyloxy, 3-butenyloxy, 1-methylallyloxy, 2-pentenyloxy, 2-hexenyloxy, and

- 16 -

the like.

The carboxy-substituted lower alkoxy group includes a carboxy - alkoxy group wherein the alkoxy moiety is a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, for example, carboxymethoxy, 2 -
5 carboxyethoxy, 1-carboxyethoxy, 3-carboxypropoxy, 4-carboxybutoxy, 5 - carboxypentyloxy, 6-carboxyhexyloxy, 1,1-dimethyl-2-carboxyethoxy, 2-methyl - 3-carboxypropoxy, and the like.

The lower alkoxycarbonyl-substituted lower alkoxy group includes a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms
10 which is substituted by a straight chain or branched chain alkoxycarbonyl group having 1 to 6 carbon atoms in the alkoxy moiety, for example, methoxy - carbonylmethoxy, 3-methoxycarbonylpropoxy, ethoxycarbonylmethoxy, 3 - ethoxycarbonylpropoxy, 4-ethoxycarbonylbutoxy, 5-isopropoxycarbonyl - pentyloxy, 6-propoxycarbonylhexyloxy, 1,1-dimethyl-2-butoxycarbonylethoxy, 2 -
15 methyl-3-tert-butoxycarbonylpropoxy, 2-pentyloxycarbonylethoxy, hexyloxy - carbonylmethoxy, and the like.

The lower alkoxycarbonyl group includes a straight chain or branched chain alkoxycarbonyl group having 1 to 6 carbon atoms in the alkoxy moiety, for example, methoxycarbonyl, ethoxycarbonyl, propoxycarbonyl,
20 isopropoxycarbonyl, butoxycarbonyl, tert-butoxycarbonyl, pentyloxycarbonyl, hexyloxycarbonyl, and the like.

The halogen-substituted lower alkoxy group includes a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms which has 1 to 3 halogen substituents, for example, trifluoromethoxy, trichloromethoxy,
25 chloromethoxy, bromomethoxy, fluoromethoxy, iodomethoxy, difluoromethoxy, dibromomethoxy, 2-chloroethoxy, 2,2,2-trifluoroethoxy, 2,2,2-trichloroethoxy, 3 - chloropropoxy, 2,3-dichloropropoxy, 4,4,4-trichlorobutoxy, 4-fluorobutoxy, 5 - chloropentyloxy, 3-chloro-2-methylpropoxy, 5-bromohexyloxy, 5,6-dichloro - hexyloxy, 5-bromohexyloxy, 5,6-dichlorohexyloxy, and the like.

The hydroxy-substituted lower alkoxy group includes a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms which is substituted by 1 to 3 hydroxy groups, for example, hydroxymethoxy, 2-hydroxy -
30 ethoxy, 1-hydroxyethoxy, 1-hydroxypropoxy, 3-hydroxypropoxy, 2,3-dihydroxy-

- 17 -

propoxy, 4-hydroxybutoxy, 1,1-dimethyl-2-hydroxyethoxy, 5,5,4-trihydroxy -
pentyloxy, 5-hydroxypentyloxy, 6-hydroxyhexyloxy, 1-hydroxyisopropoxy, 2 -
methyl-3-hydroxypropoxy, 2,3-dihydroxyethoxy, 3,4-dihydroxybutoxy, 5,6 -
dihydroxyhexyloxy, and the like.

5 The phenyl-lower alkoxy group having optionally a substituent
selected from a lower alkyl group and a lower alkoxy group on the phenyl
moiety includes a phenylalkoxy group wherein the alkoxy moiety is a straight
chain or branched chain alkoxy group having 1 to 6 carbon atoms which may
10 chain alkoxy group having 1 to 6 carbon atoms and a straight chain or
branched chain alkyl group having 1 to 6 carbon atoms on the phenyl moiety,
for example, benzyloxy, 2-phenylethoxy, 1-phenylethoxy, 3-phenylpropoxy, 4 -
phenylbutoxy, 1,1-dimethyl-2-phenylethoxy, 5-phenylpentyloxy, 6-phenyl -
hexyloxy, 2-methyl-3-phenylpropoxy, 2-(3-methoxyphenyl)ethoxy, 1-(4 -
15 methoxyphenyl)ethoxy, 2-methoxybenzyloxy, 3-(2-ethoxyphenyl)propoxy, 4-(3 -
ethoxyphenyl)butoxy, 1,1-dimethyl-2-(4-ethoxyphenyl)ethoxy, 5-(4-isopropoxy -
phenyl)pentyloxy, 6-(4-hexyloxyphenyl)hexyloxy, 3,4-dimethoxybenzyloxy,
3,4,5-trimethoxybenzyloxy, 2,5-dimethoxybenzyloxy, 3-methoxybenzyloxy, 4 -
methoxybenzyloxy, 2,4-diethoxybenzyloxy, 2,3-dimethoxybenzyloxy, 2,4 -
20 dimethoxybenzyloxy, 2,6-dimethoxybenzyloxy, 2-methylbenzyloxy, 4-ethyl -
benzyloxy, 2-(3-methylphenyl)ethoxy, 1-(4-methylphenyl)ethoxy, 3-(2-ethyl -
phenyl)propoxy, 4-(3-ethylphenyl)butoxy, 1,1-dimethyl-2-(4-ethylphenyl)ethoxy,
5-(4-isopropylphenyl)pentyloxy, 6-(4-hexylphenyl)hexyloxy, 3,4-dimethyl -
benzyloxy, 3,4,5-trimethylbenzyloxy, 2,5-dimethylbenzyloxy, 2-methoxy-3 -
25 methylbenzyloxy, and the like.

 The 1,3-dioxolanyl group having optionally a lower alkyl
substituent includes a 1,3-dioxolanyl group which may optionally be substituted
by 1 to 3 straight chain or branched chain alkyl groups having 1 to 6 carbon
atoms, for example, 1,3-dioxolanyl, 2-methyl-1,3-dioxolanyl, 4-ethyl-1,3 -
30 dioxolanyl, 2-propyl-1,3-dioxolanyl, 4-butyl-1,3-dioxolanyl, 2-pentyl-1,3 -
dioxolanyl, 4-hexyl-1,3-dioxolanyl, 2,4-dimethyl-1,3-dioxolanyl, 2,4,5-trimethyl -
1,3-dioxolanyl, and the like.

 The lower alkanoyl group includes a straight chain or branched

- 18 -

chain alkanoyl group having 1 to 6 carbon atoms, for example, formyl, acetyl, propionyl, butyryl, isobutyryl, pentanoyl, t-butylcarbonyl, hexanoyl, and the like.

5 The morpholino-substituted lower alkoxy group includes a morpholino-substituted alkoxy group wherein the alkoxy moiety is a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, for example, morpholinomethoxy, 2-morpholinoethoxy, 1-morpholinoethoxy, 3-(2 - morpholinyl)propoxy, 4-(3-morpholinyl)butoxy, 1,1-dimethyl-2-(2-morpholinyl) - ethoxy, 5-morpholinopentyloxy, 6-morpholinohexyloxy, 2-methyl-3-morpholino - propoxy, and the like.

10 The phenyl-lower alkyl group includes a phenyl-alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, benzyl, 2-phenylethyl, 1-phenylethyl, 3-phenylpropyl, 4-phenylbutyl, 5-phenylpentyl, 6-phenylhexyl, 1,1-dimethyl-2 - phenylethyl, 2-methyl-3-phenylpropyl, and the like.

15 The phenyl-lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety includes a phenyl-alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms and may optionally have 1 to 3 straight chain or branched chain alkoxy substituents having 1 to 6 carbon atoms on the phenyl moiety, for
20 example, in addition to the above mentioned phenyl-lower alkyl group, 2-(3 - methoxyphenyl)ethyl, 1-(4-methoxyphenyl)ethyl, 2-methoxybenzyl, 3-methoxy - benzyl, 4-methoxybenzyl, 3-(2-ethoxyphenyl)propyl, 4-(3-ethoxyphenyl)butyl, 1,1-dimethyl-2-(4-ethoxyphenyl)ethyl, 5-(4-isopropoxyphenyl)pentyl, 6-(4-hexyl - oxyphenyl)hexyl, 3,4-dimethoxybenzyl, 2,4-dimethoxybenzyl, 3,4,5-trimethoxy -
25 benzyl, and the like.

The furyl-substituted lower alkyl group includes a furyl-substituted alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, (2-furyl)methyl, 2-(3-furyl)ethyl, 1-(2-furyl)ethyl, 3-(2-furyl)propyl, 4-(3-furyl)butyl, 5-(2-furyl)pentyl, 6-(3-furyl) -
30 hexyl, 1,1-dimethyl-2-(2-furyl)ethyl, 2-methyl-3-(3-furyl)propyl, and the like.

The lower alkoxy-lower alkyl group includes a straight chain or branched chain alkyl group having 1 to 6 carbon atoms which is substituted by a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, for

- 19 -

example, methoxymethyl, 2-ethoxyethyl, 1-methoxyethyl, 3-methoxypropyl, 4-ethoxybutyl, 6-propoxyhexyl, 5-isopropoxypentyl, 1,1-dimethyl-2-butoxyethyl, 2-methyl-3-tert-butoxypropyl, 2-pentyloxyethyl, hexyloxymethyl, and the like.

The phenyl-lower alkenyl group having optionally a substituent
5 selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl - lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (A_4 , R^{40} and R^{41}
10 are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety includes a phenylalkenyl group wherein the alkenyl moiety is a straight chain or branched chain alkenyl group having 2 to 6 carbon atoms and having 1 to 2 double bonds, and the phenyl moiety may optionally be substituted by 1 to 3
15 groups selected from a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, a halogen atom, an amino group having optionally 1 to 2 substituents selected from a straight chain or branched chain alkanoyl group having 1 to 6 carbon atoms and a phenylalkenylcarbonyl group wherein the alkenylcarbonyl moiety is a straight chain or branched chain alkenylcarbonyl
20 group having 3 to 6 carbon atoms in the alkenylcarbonyl moiety, a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms which is substituted by a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, a tetrazolyl group having optionally a straight chain or branched chain alkyl group having 1 to 6 carbon atoms on the tetrazole ring, hydroxy
25 group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (A_4 is a straight chain or branched chain alkylene group having 1 to 6 carbon atoms, R^{40} and R^{41} are the same or different and each hydrogen atom or a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, or R^{40} and R^{41} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6 -
30 membered saturated heterocyclic ring with or without being intervened with another nitrogen atom or oxygen atom), a straight chain or branched chain alkylenyloxy group having 2 to 6 carbon atoms, nitro group, and a straight chain or branched chain alkyl group having 1 to 6 carbon atoms having

- 20 -

optionally 1 to 3 halogen substituents, for example, styryl, cinnamyl, 4-phenyl-3 -
 butenyl, 4-phenyl-2-butenyl, 5-phenyl-4-pentenyl, 5-phenyl-3-pentenyl, 5 -
 phenyl-2-pentenyl, 6-phenyl-5-hexenyl, 6-phenyl-4-hexenyl, 6-phenyl-3 -
 hexenyl, 6-phenyl-2-hexenyl, β -methyl-4-phenyl-3-butenyl, β -methyl-cinnamyl,
 5 γ -methyl-cinnamyl, 5-phenyl-2,4-pentadienyl, 4-phenyl-1,3-butadienyl, 6 -
 phenyl-2,4-hexadienyl, 6-phenyl-2,4-hexadienyl, 6-phenyl-3,5-hexadienyl, 6 -
 phenyl-1,3-hexadienyl, 5-phenyl-1,3-pentadienyl, 3-methoxycinnamyl, 4 -
 methoxycinnamyl, 2-methoxycinnamyl, 4-methoxystyryl, (2-ethoxyphenyl)-2 -
 butenyl, 5-(3-ethoxyphenyl)-4-pentenyl, α,α -dimethyl-4-ethoxycinnamyl, 5-(4 -
 10 isopropoxyphenyl)-2,4-pentadienyl, 6-(4-hexyloxyphenyl)-2-hexenyl, 3,4 -
 dimethoxycinnamyl, 3,4,5-trimethoxystyryl, 2,5-dimethoxystyryl, 3-methoxy -
 styryl, 4-methoxystyryl, 2,4-diethoxystyryl, 2,3-dimethoxycinnamyl, 2,4 -
 dimethoxycinnamyl, 2,6-dimethoxycinnamyl, 2-nitrocinnamyl, 3-nitrocinnamyl,
 4-nitrocinnamyl, 4-(2-nitrophenyl)-3-butenyl, 4-(3-nitrophenyl)-2-butenyl, 5-(2 -
 15 nitrophenyl)-2-pentenyl, 6-(3-nitrophenyl)-3-hexenyl, 3,4-dinitrocinnamyl, 3,4,5 -
 trinitrocinnamyl, 2-nitrostyryl, 3-nitrostyryl, 4-nitrostyryl, 3-methylcinnamyl, 2 -
 methylstyryl, 4-methylcinnamyl, 2-ethylcinnamyl, 4-isopropylcinnamyl, 4-(3 -
 ethylphenyl)-3-butenyl, α -methyl-4-isopropylcinnamyl, 5-(4-isopropylphenyl)-2 -
 pentenyl, 6-(4-hexylphenyl)-2-hexenyl, 3,4-dimethylcinnamyl, 3,4,5-trimethyl -
 20 cinnamyl, 2,5-dimethylcinnamyl, 2-chlorocinnamyl, 3-chlorostyryl, 2-fluoro -
 cinnamyl, 4-chlorocinnamyl, 2-fluorostyryl, 4-(3-fluorophenyl)-2-butenyl, 5-(4 -
 fluorophenyl)-2-pentenyl, α,α -dimethyl-2-bromocinnamyl, 6-(3-bromophenyl)-2 -
 hexenyl, 4-bromostyryl, 2-iodocinnamyl, 3-iodostyryl, 3,4-dichlorocinnamyl, 3,5 -
 dichlorocinnamyl, 2,6-dichlorostyryl, 2,3-dichlorocinnamyl, 2,4-dichlorostyryl, 3,4 -
 25 difluorocinnamyl, 3,5-dibromocinnamyl, 3,4,5-trichlorocinnamyl, 2-methoxy-3 -
 chlorocinnamyl, 3-(4-acetylaminophenyl)-2-butenyl, 3-(2-trifluoromethylphenyl) -
 2-butenyl, 3-[4-(1-methyltetrazol-5-yl)phenyl]-2-butenyl, 3-(4-cinnamoylamino -
 phenyl)-2-butenyl, 3-(3-methoxymethoxyphenyl)-2-butenyl, 3-(2-methoxy -
 phenyl)-2-butenyl, 3-(3-methoxyphenyl)-2-butenyl, 3-(4-trifluoromethylphenyl) -
 30 2-butenyl, 3-(3-trifluoromethylphenyl)-2-butenyl, 3-(3-acetylaminophenyl)-2 -
 butenyl, 3-(3-hydroxyphenyl)-2-butenyl, 3-(3-morpholinocarbonylmethoxy-

- 21 -

phenyl)-2-butenyl, 3-(3-diethylaminocarbonylmethoxyphenyl)-2-butenyl, 3-[3-(2-methyl-2-propenyloxy)phenyl]-2-butenyl, 4-chloromethylstyryl, 3-bromomethyl -
 cinnamyl, 4-(2-iodomethylphenyl)-3-butenyl, 4-[4-(2,2,2-trichloroethyl)phenyl]-2 -
 butenyl, 5-(4-aminophenyl)-4-pentenyl, 5-(3-propionylaminophenyl)-2 -
 5 pentenyl, 6-(2-butyrylaminophenyl)-5-hexenyl, 6-(4-pentanoylaminophenyl)-4 -
 hexenyl, 6-(3-hexanoylaminophenyl)-3-hexenyl, 6-(2,4-diaminophenyl)-2 -
 hexenyl, 2,4,6-triaminocinnamyl, 4-(3-butenoylamino)styryl, 3-(2-pentenoyl -
 amino)cinnamyl, 4-[2-(4-hexenoylamino)phenyl]-3-butenyl, 4-[4-(4-ethoxy -
 butoxy)phenyl]-2-butenyl, 3-[4-(N-acetyl-N-cinnamoylamino)phenyl]-2-butenyl,
 10 5-[2-(6-propoxyhexyloxy)phenyl]-4-pentenyl, 6-[3-(2-pentyloxyethoxy)phenyl]-2 -
 pentenyl, 6-(4-hexyloxymethoxyphenyl)-5-hexenyl, 6-[2-(1,1-dimethyl-2-butoxy -
 ethoxy)phenyl]-3-hexenyl, 3-(2,4-dimethoxymethoxyphenyl)-2-butenyl, 3-(2,4,6 -
 trimethoxyphenyl)-2-butenyl, 3-[4-(1-ethyltetrazol-5-yl)phenyl]-2-butenyl, 3-[3-(2 -
 propyltetrazol-5-yl)phenyl]-2-butenyl, 3-[2-(1-butyltetrazol-5-yl)phenyl]-2 -
 15 butenyl, 3-[4-(2-pentyltetrazol-5-yl)phenyl]-2-butenyl, 3-[3-(1-hexyltetrazol-5-yl) -
 phenyl]-2-butenyl, 2-hydroxycinnamyl, 3-hydroxycinnamyl, 4-hydroxycinnamyl,
 4-(2-hydroxyphenyl)-3-butenyl, 5-(2-hydroxyphenyl)-2-pentenyl, 6-(3-hydroxy -
 phenyl)-3-hexenyl, 2,4-dihydroxycinnamyl, 3,4,5-trihydroxycinnamyl, 4-hydroxy -
 cinnamyl, 4-allyloxystyryl, 3-(2-butenyloxy)cinnamyl, 4-[2-(3-butenyloxy)phenyl] -
 20 3-butenyl, 5-[3-(2-pentenylloxy)phenyl]-2-pentenyl, 6-[4-(2-hexenyloxy)phenyl] -
 4-hexenyl, 2,4-diallyloxycinnamyl, 2,4,6-triallyloxystyryl, 3-(2-dimethylamino -
 carbonylethoxyphenyl)-2-butenyl, 4-[4-(3-butylaminocarbonylpropoxy)phenyl] -
 3-butenyl, 5-[2-(4-pentylaminocarbonylbutoxy)phenyl]-3-pentenyl, 6-[3-(5-hexyl -
 aminocarbonylpentyloxy)phenyl]-5-hexenyl, 4-[6-(N-methyl-N-propylamino) -
 25 carbonylhexyloxy]styryl, 4-methylaminocarbonylmethoxycinnamyl, 4-(1 -
 piperidinyl)carbonylmethoxycinnamyl, 3-(1-piperazinyl)carbonylmethoxystyryl,
 4-[3-(1-pyrrolidinyl)carbonylmethoxyphenyl]-3-butenyl, 3-(2-methoxy-5-chloro -
 phenyl)-2-butenyl, 3-(2-methoxymethoxy-5-chlorophenyl)-2-butenyl, 3-(2 -
 hydroxy-5-chlorophenyl)-2-butenyl, and the like.

30 The alkenyl group includes a straight chain or branched chain
 alkenyl group with 1 to 3 double bonds having 2 to 12 carbon atoms, for
 example, vinyl, allyl, 3-methyl-2-butenyl, 2-butenyl, 3-butenyl, 1-methylallyl, 2 -
 pentenyl, 2-hexenyl, 1-heptenyl, 1-octenyl, 1-nonenyl, 1-decenyl, 1-undecenyl,

- 22 -

2-dodecenyl, 2-heptenyl, 3-heptenyl, 3-methyl-4-heptenyl, 2-methyl-5-heptenyl,
 4-methyl-2-heptenyl, 3-methyl-1-heptenyl, 1,3-heptadienyl, 1,4-heptadienyl, 1,5 -
 heptadienyl, 1,6-heptadienyl, 2,4-heptadienyl, 2-methyl-2,4-heptadienyl, 2,6 -
 dimethyl-2,4-heptadienyl, 2,5-dimethyl-1,3-heptadienyl, 2,4,6-trimethyl-2,4 -
 5 heptadienyl, 2-octenyl, 3-octenyl, 4-octenyl, 2-methyl-5-octenyl, 3-methyl-6 -
 octenyl, 2-methyl-7-octenyl, 1,3-octadienyl, 1,4-octadienyl, 1,5-octadienyl, 1,6 -
 octadienyl, 1,7-octadienyl, 2,4-octadienyl, 3,7-octadienyl, 4,8-dimethyl-3,7 -
 octadienyl, 2,4,6-trimethyl-3,7-octadienyl, 3,4-dimethyl-2,5-octadienyl, 3,7 -
 dimethyl-2,6-octadienyl, 4,8-dimethyl-2,6-octadienyl, 2-nonenyl, 3-nonenyl, 4 -
 10 nonenyl, 2-methyl-5-nonenyl, 2-methyl-6-nonenyl, 2-methyl-7-nonenyl, 2 -
 methyl-8-nonenyl, 1,3-nonadienyl, 1,4-nonadienyl, 1,5-nonadienyl, 1,6 -
 nonadienyl, 1,7-nonadienyl, 1,8-nonadienyl, 2,4-nonadienyl, 3,7-nonadienyl,
 4,8-dimethyl-3,7-nonadienyl, 2,4,6-trimethyl-3,7-nonadienyl, 3,4-dimethyl-2,5 -
 nonadienyl, 4,8-dimethyl-2,6-nonadienyl, 2-decenyl, 3-decenyl, 4-decenyl, 5 -
 15 decenyl, 2-methyl-6-decenyl, 3-methyl-7-decenyl, 4-methyl-8-decenyl, 5-methyl -
 9-decenyl, 1,3-decadienyl, 1,4-decadienyl, 1,5-decadienyl, 1,6-decadienyl, 1,7 -
 decadienyl, 1,8-decadienyl, 1,9-decadienyl, 2-methyl-2,4-decadienyl, 3-methyl -
 2,5-decadienyl, 4,8-dimethyl-2,6-decadienyl, 2,4,6-trimethyl-3,7-decadienyl,
 2,9-dimethyl-3,7-decadienyl, 2-undecenyl, 3-undecenyl, 4-undecenyl, 5 -
 20 undeceyl, 2-methyl-6-undecenyl, 3-methyl-7-undecenyl, 4-methyl-8-undecenyl,
 5-methyl-9-undecenyl, 2-methyl-10-undecenyl, 1,3-undecadienyl, 1,4 -
 undecadienyl, 1,5-undecadienyl, 1,6-undecadienyl, 1,7-undecadienyl, 1,8 -
 undecadienyl, 1,9-undecadienyl, 1,10-undecadienyl, 2-methyl-2,4 -
 undecadienyl, 3-methyl-2,5-undecadienyl, 4,8-dimethyl-2,6-undecadienyl,
 25 2,4,6-trimethyl-3,8-undecadienyl, 2,9-dimethyl-3,8-undecadienyl, 2-dodecenyl,
 3-dodecenyl, 4-dodecenyl, 5-dodecenyl, 6-dodecenyl, 2-methyl-7-dodecenyl, 3 -
 methyl-8-dodecenyl, 4-methyl-9-dodecenyl, 5-methyl-10-dodecenyl, 6-methyl -
 11-dodecenyl, 2-methyl-2,4-dodecadienyl, 3-methyl-2,5-dodecadienyl, 4,8 -
 dimethyl-2,6-dodecadienyl, 2,4,6-trimethyl-2,7-dodecadienyl, 2,10-dimethyl-2,8 -
 30 dodecadienyl, 2,5-dimethyl-3,7-dodecadienyl, 4,8,12-trimethyl-3,7,11-dodeca -
 trienyl, 1,3,5-heptatrienyl, 2,4,6-octatrienyl, 1,3,6-nonatrienyl, 2,6,8 -
 dodecatienyl, 1,5,7-undecatrienyl, and the like.

The cycloalkyl-lower alkyl group includes a straight chain or

- 23 -

branched chain alkyl group having 1 to 6 carbon atoms, which is substituted by a cycloalkyl group having 3 to 8 carbon atoms, for example, cyclohexylmethyl, 2-cyclopropylethyl, 1-cyclobutylethyl, 3-cyclopentylpropyl, 4-cyclohexylbutyl, 2,2-dimethyl-3-cycloheptylpropyl, 5-cyclooctylpentyl, 6-cyclohexylhexyl, and the like.

The naphthyl-lower alkyl group includes a naphthyl-alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, α -naphthylmethyl, β -naphthylmethyl, 2-(α -naphthyl)ethyl, 1-(β -naphthyl)ethyl, 3-(β -naphthyl)propyl, 4-(α -naphthyl) - butyl, 2-methyl-3-(α -naphthyl)propyl, 5-(β -naphthyl)pentyl, 6-(α -naphthyl)hexyl, 1,1-dimethyl-2-(β -naphthyl)ethyl, and the like.

The phenylthio-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety includes a phenylthio-alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms and may optionally have 1 to 3 substituents of straight chain or branched chain alkoxy group having 1 to 3 carbon atoms on the phenyl moiety, for example, phenylthiomethyl, 2-phenylthioethyl, 1 - phenylthioethyl, 3-phenylthiopropyl, 4-phenylthiobutyl, 5-phenylthiopentyl, 6 - phenylthiohexyl, 1,1-dimethyl-2-phenylthioethyl, 2-methyl-3-phenylthiopropyl, (2-methoxyphenylthio)methyl, (3-methoxyphenylthio)methyl, 2-(4-methoxy - phenylthio)ethyl, 1-(2-ethoxyphenylthio)ethyl, 3-(4-isopropoxyphenylthio) - propyl, 4-(3-pentyloxyphenylthio)butyl, 5-(4-hexyloxyphenylthio)pentyl, 6-(2 - butyloxyphenylthio)hexyl, (3,4-dimethoxyphenylthio)methyl, (3-ethoxy-4 - methoxyphenylthio)methyl, 2-(2,3-dimethoxyphenylthio)ethyl, 1-(2,6-dimethoxy - phenylthio)ethyl, 2-(3,4,5-trimethoxyphenylthio)ethyl, and the like.

The phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety includes a phenylsulfinylalkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, and may optionally have 1 to 3 substituents of straight chain or branched chain alkoxy group having 1 to 6 carbon atoms on the phenyl moiety, for example, phenylsulfinylmethyl, 2-phenylsulfinylethyl, 1-

- 24 -

phenylsulfinylethyl, 3-phenylsulfinylpropyl, 4-phenylsulfinylbutyl, 5-phenyl -
sulfinylpentyl, 6-phenylsulfinylhexyl, 1,1-dimethyl-2-phenylsulfinylethyl, 2 -
methyl-3-phenylsulfinylpropyl, (2-methoxyphenylsulfinyl)methyl, (3-methoxy -
phenylsulfinyl)methyl, 2-(4-methoxyphenylsulfinyl)ethyl, 1-(2-ethoxyphenyl -
sulfinyl)ethyl, 3-(4-isopropoxyphenylsulfinyl)propyl, 4-(3-pentyloxyphenyl -
sulfinyl)butyl, 5-(4-hexyloxyphenylsulfinyl)pentyl, 6-(2-butyloxyphenylsulfinyl) -
hexyl, (3,4-dimethoxyphenylsulfinyl)methyl, 3-ethoxy-4-methoxyphenylsulfinyl) -
methyl, 2-(2,3-dimethoxyphenylsulfinyl)ethyl, 1-(2,6-dimethoxyphenylsulfinyl) -
ethyl, 2-(3,4,5-trimethoxyphenylsulfinyl)ethyl, and the like.

The phenylsulfonyl-substituted lower alkyl group having
optionally a lower alkoxy substituent on the phenyl moiety includes a
phenylsulfonyl-alkyl group wherein the alkyl moiety is a straight chain or
branched chain alkyl group having 1 to 6 carbon atoms, which may optionally
have 1 to 3 substituents of straight chain or branched chain alkoxy group
having 1 to 6 carbon atoms on the phenyl moiety, for example, phenylsulfonyl -
methyl, 2-phenylsulfonylethyl, 1-phenylsulfonylethyl, 3-phenylsulfonylpropyl, 4 -
phenylsulfonylbutyl, 5-phenylsulfonylpentyl, 6-phenylsulfonylhexyl, 1,1 -
dimethyl-2-phenylsulfonylethyl, 2-methyl-3-phenylsulfonylpropyl, (2-methoxy -
phenylsulfonyl)methyl, (3-methoxyphenylsulfonyl)methyl, 2-(4-methoxyphenyl -
sulfonyl)ethyl, 1-(2-ethoxyphenylsulfonyl)ethyl, 3-(4-isopropoxyphenylsulfonyl) -
propyl, 4-(3-pentyloxyphenylsulfonyl)butyl, 5-(4-hexyloxyphenylsulfonyl)pentyl,
6-(2-butyloxyphenylsulfonyl)hexyl, 3,4-dimethoxyphenylsulfonylmethyl, 3 -
ethoxy-4-methoxyphenylsulfonyl)methyl, 2-(2,3-dimethoxyphenylsulfonyl)ethyl,
1-(2,6-dimethoxyphenylsulfonyl)ethyl, 2-(3,4,5-trimethoxyphenylsulfonyl)ethyl,
and the like.

The 5- to 14-membered saturated or unsaturated hetero -
monocyclic, heterobicyclic or heterotricyclic group having 1 to 4 heteroatoms
selected from nitrogen atom, oxygen atom and sulfur atom includes, for
example, pyrrolidinyl, piperidinyl, piperazinyl, morpholino, pyridyl, thienyl,
quinolyl, 1,4-dihydroquinolyl, benzothiazolyl, pyrazinyl, pyrimidyl, pyridazinyl,
pyrrolyl, carbostyryl, 3,4-dihydrocarbostyryl, 1,2,3,4-tetrahydroquinolyl, indolyl,
isoindolyl, indolinyl, benzimidazolyl, benzoxazolyl, imidazolidinyl, isoquinolyl,
quinazolidinyl, quinoxalinyl, cinnonyl, phthalazinyl, chromanyl, isoindolinyl,

- 25 -

isochromanyl, pyrazolyl, imidazolyl, pyrazolidinyl, 2,3-dihydrobenzofuryl, perhydrobenzofuryl, benzofuryl, benzothienyl, 4H-chromenyl, 1,3,4-oxadiazolyl, 1,2,4-triazolyl, 1,2,3,4-tetrazolyl, 1,3,4-triazolyl, 1,2,4-oxadiazolyl, 2,3-dihydrobenzofuryl, perhydrobenzofuryl, 5-1H-indazolyl, furyl, pyrrolinyl, 5 noly, oxazolyl, isoxazolyl, thiazolyl, thiazolidinyl, 1,2,3,5-oxathiadiazolyl, isothiazolyl, pyranyl, pyrazolidinyl, quinuclidinyl, 1,4-benzoxazinyl, 3,4-dihydro-2H-1,4-benzoxazinyl, 1,4-benzothiazinyl, 1,2,3,4-tetrahydroquinoxalyl, 1,3-dithia-2,4-dihydronaphthalenyl, 1,4-dithianaphthalenyl, furo[3,2-c]pyridyl, furo[2,3-g]quinolyl, 3,4-dihydrofuro[2,3-g]quinolyl, 1,2,3,4-tetrahydrofuro[2,3-g]quinolyl, 1,4-benzodioxanyl, 1,2,4-triazinyl, naphtho[2,1-b]furyl, imidazo[1,2-a]pyridyl, and the like. 10

The lower alkyl group which is substituted by a 5- to 14 - membered saturated or unsaturated heteromonocyclic, heterobicyclic or heterotricyclic group having 1 to 4 heteroatoms selected from nitrogen atom, oxygen atom and sulfur atom includes, for example, pyrrolidinylmethyl, 2 - 15 piperidinylethyl, 3-piperazinylpropyl, 4-morpholinobutyl, (2-pyridyl)methyl, (3-pyridyl)methyl, (2-thienyl)methyl, (3-quinolyl)methyl, 5-(6-quinolyl)pentyl, 6-(1,4-dihydro-2-quinolyl)hexyl, (2-benzothiazolyl)methyl, 2-(3-pyrazinyl)ethyl, 1-(2-pyrimidyl)ethyl, 3-(3-pyridazinyl)propyl, 4-(2-pyrrolyl)butyl, 5-(3-carbostyryl) - 20 pentyl, 6-(3,4-dihydrocarbostyryl-6-yl)hexyl, (1,2,3,4-tetrahydroquinolyl-8-yl)methyl, (2-indolyl)methyl, (3-indolyl)methyl, 2-(3-indolyl)ethyl, (4-isoindolyl) - methyl, 2-(3-indolinyl)ethyl, (2-benzoimidazolyl)methyl, 3-(5-benzoxazolyl) - propyl, 4-(4-imidazolidinyl)butyl, 5-(1-isoquinolyl)pentyl, 6-(7-quinazolidinyl) - 25 hexyl, (8-quinoxalyl)methyl, 1-(4-cinnolyl)ethyl, 3-(5-phthalazinyl)propyl, 4-(6-chromanyl)butyl, 5-(4-isoindolinyl)pentyl, 6-(7-isochromanyl)hexyl, (3-pyrazolyl)methyl, 2-(2-imidazolyl)ethyl, 3-(3-pyrazolidinyl)propyl, (2-benzofuryl) - methyl, (3-benzofuryl)methyl, 4-(6-benzofuryl)butyl, (2-benzothienyl)methyl, (3-benzothienyl)methyl, 5-(5-benzothienyl)pentyl, [6-(4H-chromenyl)]methyl, (2,3-dihydro-2-benzofuryl)methyl, (2-perhydrobenzofuryl)methyl, (5-1H-indazolyl) - 30 methyl, thienylmethyl, 1-(5-isoindolinyl)ethyl, 3-(2-imidazolyl)propyl, 4-(2-pyrrolinyl)butyl, (2-furyl)methyl, (4-oxazolyl)methyl, (5-oxazolyl)methyl, 5-(4-oxazolyl)pentyl, 6-(3-isoxazolyl)hexyl, (4-thiazolyl)methyl, (2-thiazolyl)methyl, 2-(3-isothiazolyl)ethyl, (2-pyranyl)methyl, 3-(3-pyrazolidinyl)propyl, 4-(2-

- 26 -

pyrazolinyl)butyl, 5-(2-quinuclidinyl)pentyl, (1,4-benzoxazin-6-yl)methyl, (3,4 -
dihydro-2H-1,4-benzoxazin-2-yl)methyl, (1,4-benzothiazin-5-yl)methyl, (1,2,3,4 -
tetrahydroquinoxaliny-6-yl)methyl, (1,3-dithia-2,4-dihydronaphthalen-6-yl) -
methyl, (1,4-dithianaphthalen-7-yl)methyl, (5-thiazolyl)methyl, (1,3,4 -
5 oxadiazolin-5-yl)methyl, (1,2,4-triazol-5-yl)methyl, (1,2,3,4-tetrazol-5-yl)methyl,
(1,3,4-triazol-5-yl)methyl, (1,2,4-oxadiazol-5-yl)methyl, (1,2,4-triazin-3-yl) -
methyl, (thiazolidin-5-yl)methyl, (1,2,3,5-oxathiazolin-4-yl)methyl, (3-furyl) -
methyl, (2-furyl)methyl, (2-imidazolyl)methyl, 2-(5-thiazolyl)ethyl, 1-(1,3,4 -
oxadiazolin-2-yl)ethyl, 3-(1,2,4-triazol-3-yl)propyl, 4-(1,2,3,4-tetrazol-5-yl)butyl,
10 6-(1,3,4-triazol-2-yl)hexyl, 2-(1,2,4-oxadiazol-3-yl)ethyl, 1-(1,2,4-triazin-5-yl) -
ethyl, 3-(thiazolidin-2-yl)propyl, 4-(1,2,3,5-oxathiadiazolin-4-yl)butyl, 5-(furo[3,2 -
c]pyridin-2-yl)pentyl, 6-(furo[2,3-g]quinolin-7-yl)hexyl, (3,4-dihydrofuro[2,3-g] -
quinolin-8-yl)methyl, 2-(1,2,3,4-tetrahydrofuro[2,3-g]quinolin-4-yl)ethyl, (1,4 -
benzodioxan-2-yl)methyl, 1-(1,4-benzodioxadin-3-yl)ethyl, (2,3-dihydrobenzo -
15 furan-2-yl)methyl, (perhydrobenzofuran-2-yl)methyl, naphtho[2,1-b]furylmethyl,
4-(naphtho[2,1-b]furyl)pentyl, imidazo[1,2-a]pyridylmethyl, 2-(imidazo[1,2-a] -
pyridyl)ethyl, 1-(imidazo[1,2-a]pyridyl)ethyl, and the like.

The phenoxy-substituted lower alkyl group includes a
phenoxyalkyl group wherein the alkyl moiety is a straight chain or branched
20 chain alkyl group having 1 to 6 carbon atoms, for example, phenoxymethyl, 2 -
phenoxyethyl, 1-phenoxyethyl, 3-phenoxypropyl, 4-phenoxybutyl, 5-phenoxy -
pentyl, 6-phenoxyhexyl, 1,1-dimethyl-2-phenoxyethyl, 2-methyl-3-phenoxy -
propyl, and the like.

The phenyl-lower alkoxy group which may optionally have an
25 amino substituent having optionally a lower alkanoyl substituent on the phenyl
moiety includes a phenylalkoxy group, wherein the alkoxy moiety is a straight
chain or branched chain alkoxy group having 1 to 6 carbon atoms, which may
optionally have 1 to 3 substituents of amino group having optionally a straight
chain or branched chain alkanoyl group having 1 to 6 carbon atoms, for
30 example, benzyloxy, 2-phenylethoxy, 1-phenylethoxy, 3-phenylpropoxy, 4 -
phenylbutoxy, 5-phenylpentylloxy, 6-phenylhexyloxy, 1,1-dimethyl-2-phenyl -
ethoxy, 2-methyl-3-phenylpropoxy, 4-acetylaminobenzyloxy, 2-(2-propionyl -
aminophenyl)ethoxy, 1-(3-butyrylaminophenyl)ethoxy, 3-(4-pentanoylamino-

- 27 -

phenyl)propoxy, 4-(3-tert-butylcarbonylaminophenyl)butoxy, 5-(4-hexanoyl -
aminophenyl)pentyl, 6-(3,4-bisacetylaminophenyl)hexyl, 3,4,5-triacetyl -
aminobenzyl, 2,4-bisacetylaminobenzyl, 4-aminobenzyl, 2,3 -
diaminobenzyl, 2,4,6-triaminobenzyl, 2-(3-aminophenyl)ethoxy, 3-(2 -
aminophenyl)propoxy, and the like.

The lower alkoxy-substituted lower alkoxy group includes a
straight chain or branched chain alkoxy group having 1 to 6 carbon atoms
which is substituted by a straight chain or branched chain alkoxy group having
1 to 6 carbon atoms, for example, methoxymethoxy, 3-methoxypropoxy, 4 -
ethoxybutoxy, 6-propoxyhexyl, 5-isopropoxypentyl, 1,1-dimethyl-2 -
butoxyethoxy, 2-methyl-3-tert-butoxypropoxy, 2-pentylmethoxy, hexyl -
methoxy, and the like.

The lower alkanoyloxy-substituted lower alkyl group includes a
straight chain or branched chain alkyl group having 1 to 6 carbon atoms which
is substituted by a straight chain or branched chain alkanoyloxy group having 2
to 6 carbon atoms, for example, acetyloxymethyl, 2,2-dimethylpropionyl -
methyl, propionylmethyl, 2-propionylethyl, 1-acetyloxyethyl, 1-butyryl -
oxyethyl, 3-acetylpropyl, 4-isobutyryloxybutyl, 5-pentanoyloxypropyl, 6-tert -
butylcarbonyloxyhexyl, 1,1-dimethyl-2-hexanoyloxyethyl, 2-methyl-3-acetyl -
propyl, and the like.

The halogen-substituted lower alkyl group includes a straight
chain or branched chain alkyl group having 1 to 6 carbon atoms which is
substituted by 1 to 3 halogen atoms, for example, trifluoromethyl, trichloro -
methyl, chloromethyl, bromomethyl, fluoromethyl, iodomethyl, difluoromethyl,
dibromomethyl, 2-chloroethyl, 2,2,2-trifluoroethyl, 2,2,2-trichloroethyl, 3 -
chloropropyl, 2,3-dichloropropyl, 4,4,4-trichlorobutyl, 4-fluorobutyl, 5-chloro -
pentyl, 3-chloro-2-methylpropyl, 5-bromohexyl, 5,6-dichlorohexyl, 5-bromo -
hexyl, 5,6-dichlorohexyl, and the like.

The tetrazolyl group having optionally a lower alkyl substituent on
the tetrazole ring includes a tetrazolyl group having optionally a straight chain
or branched chain alkyl group having 1 to 6 carbon atoms on the tetrazole ring,
for example, tetrazolyl, 1-methyltetrazolyl, 2-methyltetrazolyl, 5-ethyltetrazolyl, 5 -
propyltetrazolyl, 1-butyloxytetrazolyl, 2-pentyltetrazolyl, 1-hexyltetrazolyl, and the

- 28 -

like.

The phenyl group having optionally a substituent selected from a lower alkyl group, a lower alkoxy-substituted lower alkoxy group, hydroxy group, a halogen atom and a lower alkoxy group includes a phenyl group which may optionally have 1 to 3 substituents selected from a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms which is substituted by a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, hydroxy group, a halogen atom and a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, for example, phenyl, 2-methylphenyl, 3-methylphenyl, 4-methylphenyl, 2-ethylphenyl, 3-ethylphenyl, 4-ethylphenyl, 3-isopropylphenyl, 4-hexylphenyl, 3,4-dimethylphenyl, 2,5-dimethylphenyl, 3,4,5-trimethylphenyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 4-isopropoxyphenyl, 4-pentyloxyphenyl, 2,4-dimethoxyphenyl, 4-hexyloxyphenyl, 3,4-dimethoxyphenyl, 3-ethoxy-4-methoxyphenyl, 2,3-dimethoxyphenyl, 3,4-diethoxyphenyl, 2,5-dimethoxyphenyl, 2,6-dimethoxyphenyl, 3,5-dimethoxyphenyl, 3,4-dipentyloxyphenyl, 3,4,5-trimethoxyphenyl, 2-chlorophenyl, 3-chlorophenyl, 4-chlorophenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2-bromophenyl, 3-bromophenyl, 4-bromophenyl, 2-iodophenyl, 3-iodophenyl, 4-iodophenyl, 3,4-dichlorophenyl, 3,5-dichlorophenyl, 2,6-dichlorophenyl, 2,3-dichlorophenyl, 2,4-dichlorophenyl, 3,4-difluorophenyl, 3,5-dibromophenyl, 3,4,5-trichlorophenyl, 2-methoxy-5-chlorophenyl, 3-chloro-4-methoxyphenyl, 3-methoxy-5-iodophenyl, 3,4-dimethoxy-5-bromophenyl, 3,5-diiodo-4-methoxyphenyl, 2-hydroxy-5-chlorophenyl, 2-methoxymethoxy-5-chlorophenyl, 2-hydroxyphenyl, 3-hydroxyphenyl, 4-hydroxyphenyl, 2,3-dihydroxyphenyl, 3,4-dihydroxyphenyl, 3,4,5-trihydroxyphenyl, 2-methoxymethoxyphenyl, 3-(3-methoxypropoxy)phenyl, 4-(4-ethoxybutoxy)phenyl, 2-(6-propoxyhexyloxy)phenyl, 3-(5-isopropoxypentyloxy)phenyl, 4-(1,1-dimethyl-2-butoxyethoxy)phenyl, 2-(2-methyl-3-tert-butoxypropoxy)phenyl, 3-(2-pentyloxyethoxy)phenyl, 4-hexyloxymethoxyphenyl, 2,3-dimethoxymethoxyphenyl, 3,4,5-trimethoxymethoxyphenyl, and the like.

The lower alkenyl group includes a straight chain or branched chain alkenyl group having 2 to 6 carbon atoms, for example, vinyl, allyl, 2-

- 29 -

butenyl, 3-butenyl, 1-methylallyl, 2-pentenyl, 2-hexenyl, and the like.

The morpholinocarbonyl-lower alkoxy group includes a morpholinocarbonylalkoxy group wherein the alkoxy moiety is a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, for example,
5 morpholinocarbonylmethoxy, 2-morpholinocarbonylethoxy, 1-morpholino - carbonylethoxy, 3-(2-morpholinocarbonyl)propoxy, 4-(3-morpholinocarbonyl) - butoxy, 1,1-dimethyl-2-(2-morpholinylcarbonyl)ethoxy, 5-morpholinylcarbonyl - pentyloxy, 6-morpholinocarbonylhexyloxy, 2-methyl-3-morpholinocarbonyl - propoxy, and the like.

10 The morpholinocarbonyl-lower alkyl group includes a morpholinocarbonylalkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, morpholinocarbonylmethyl, 2-morpholinocarbonylethyl, 1-morpholinocarbonyl - ethyl, 3-(2-morpholinocarbonyl)propyl, 4-(3-morpholinocarbonyl)butyl, 1,1 -
15 dimethyl-2-(2-morpholinocarbonyl)ethyl, 5-morpholinocarbonylpentyl, 6 - morpholinocarbonylhexyl, 2-methyl-3-morpholinocarbonylpropyl, and the like.

The cycloalkylcarbonyl group includes a cycloalkylcarbonyl group having 3 to 8 carbon atoms in the cycloalkyl moiety, for example, cyclopropyl - carbonyl, cyclobutylcarbonyl, cyclopentylcarbonyl, cyclohexylcarbonyl,
20 cycloheptylcarbonyl, cyclooctylcarbonyl, and the like.

The phenyl-lower alkenylcarbonyl group includes a phenylalkenyl - carbonyl group wherein the alkenylcarbonyl moiety is a straight chain or branched chain alkenylcarbonyl group having 3 to 6 carbon atoms in the alkenylcarbonyl moiety, for example, cinnamoyl, 4-phenyl-2-butenoyl, 4-phenyl -
25 3-butenoyl, 5-phenyl-4-pentenoyl, 5-phenyl-3-pentenoyl, 5-phenyl-2 - pentenoyl, 6-phenyl-5-hexenoyl, 6-phenyl-4-hexenoyl, 6-phenyl-3-hexenoyl, 6 - phenyl-2-hexenoyl, 2-methyl-4-phenyl-3-butenoyl, 2-methyl-cinnamoyl, 1 - methyl-cinnamoyl, and the like.

30 The 5- to 6-membered saturated heterocyclic group which is formed by combining R⁶ and R⁷, R⁹ and R¹⁰, R⁴⁰ and R⁴¹ or R⁵² and R⁵³ together with the adjacent nitrogen atom with or without being intervening with nitrogen atom or oxygen atom, for example, pyrrolidinyl, piperidinyl, piperazinyl, morpholino, and the like.

- 30 -

The above heterocyclic group having 1 to 3 substituents selected from hydroxy group, a lower alkyl group and a phenyl-lower alkyl group includes the above mentioned heterocyclic groups having 1 to 3 substituents selected from hydroxy group, a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, and a phenylalkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, 3-hydroxypyrrolidinyl, 2-hydroxypyrrolidinyl, 4-hydroxypiperidinyl, 3-hydroxypiperidinyl, 2-hydropiperidinyl, 3-hydroxypiperazinyl, 2-hydroxypiperazinyl, 3-hydroxymorpholino, 2-hydroxymorpholino, 4-benzylpiperazinyl, 3-(2-phenylethyl)pyrrolidinyl, 2-(3-phenylpropyl)pyrrolidinyl, 4-(4-phenylbutyl)piperidinyl, 3-(5-phenylpentyl)morpholino, 2-(6-phenylhexyl)piperazinyl, 4-methylpiperazinyl, 3,4-dimethylpiperazinyl, 3-ethylpyrrolidinyl, 2-propylpyrrolidinyl, 3,4,5-trimethylpiperidinyl, 4-butylpiperidinyl, 3-pentylmorpholino, 2-hexylpiperazinyl, 3-methyl-4-benzylpiperazinyl, 3-ethyl-4-hydroxypiperidinyl, 3-methyl-4-benzylpyrrolidinyl, and the like.

The amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group includes an amino group having optionally 1 to 2 substituents selected from a straight chain or branched chain alkanoyl group having 1 to 6 carbon atoms and a phenylalkenylcarbonyl group wherein the alkenylcarbonyl moiety is a straight chain or branched chain alkenylcarbonyl group having 3 to 6 carbon atoms in the alkenylcarbonyl moiety, for example, amino, formylamino, acetylamino, propionylamino, butyrylamino, isobutyrylamino, pentanoylamino, t-butylcarbonylamino, hexanoylamino, cinnamoylamino, 4-phenyl-3-butenoylamino, 4-phenyl-2-butenoylamino, 5-phenyl-4-pentenoylamino, 5-phenyl-3-pentenoylamino, 5-phenyl-2-pentenoylamino, 6-phenyl-5-hexenoylamino, 6-phenyl-4-hexenoylamino, 6-phenyl-3-hexenoylamino, 6-phenyl-2-hexenoylamino, 2-methyl-4-phenyl-3-butenoylamino, 2-methyl-cinnamoylamino, 1-methylcinnamoylamino, N-acetyl-N-cinnamoylamino, and the like.

The amino group having optionally a lower alkanoyl substituent includes an amino group having optionally a substituent of a straight chain or branched chain alkanoyl group having 1 to 6 carbon atoms, for example, amino, formylamino, acetylamino, propionylamino, butyrylamino, isobutyryl-

- 31 -

amino, pentanoylamino, tert-butylcarbonylamino, hexanoylamino, and the like.

The alkylsulfinyl group includes a straight chain or branched chain alkylsulfinyl group having 1 to 6 carbon atoms, for example, methylsulfinyl, ethylsulfinyl, isopropylsulfinyl, butylsulfinyl, tert-butylsulfinyl, pentylsulfinyl, hexylsulfinyl, and the like.

The lower alkylthio group includes a straight chain or branched chain alkylthio group having 1 to 6 carbon atoms, for example, methylthio, ethylthio, propylthio, isopropylthio, butylthio, tert-butylthio, pentylthio, hexylthio, and the like.

The lower alkylsulfonyl group includes a straight chain or branched chain alkylsulfonyl group having 1 to 6 carbon atoms, for example, methylsulfonyl, ethylsulfonyl, isopropylsulfonyl, butylsulfonyl, tert-butylsulfonyl, pentylsulfonyl, hexylsulfonyl, and the like.

The lower alkanoyloxy group includes a straight chain or branched chain alkanoyloxy group having 1 to 6 carbon atoms, for example, formyloxy, acetyloxy, propionyloxy, butyryloxy, isobutyryloxy, pentanoyloxy, tert-butylcarbonyloxy, hexanoyloxy, and the like.

The amino-substituted lower alkyl group having optionally a substituent selected from a lower alkylsulfonyl group and a lower alkanoyl group includes a straight chain or branched chain alkyl group having 1 to 6 carbon atoms which is substituted by an amino group having optionally 1 to 2 groups selected from a straight chain or branched chain alkylsulfonyl group having 1 to 6 carbon atoms and a straight chain or branched chain alkanoyl group having 1 to 6 carbon atoms, for example, aminomethyl, 2-aminoethyl, 1-aminoethyl, 3-aminopropyl, 4-aminobutyl, 5-aminopentyl, 6-aminoethyl, 1,1-dimethyl-2-aminoethyl, 2-methyl-3-aminopropyl, formylaminomethyl, 1-acetyl-aminoethyl, 2-propionylaminoethyl, 3-butyrylaminoethyl, 4-pentanoylaminoethyl, 5-hexanoylaminoethyl, 6-isobutyrylaminoethyl, 1,1-dimethyl-2-acetyl-aminoethyl, 2-methyl-3-formylaminopropyl, methylsulfonylaminoethyl, 2-ethylsulfonylaminoethyl, 1-isopropylsulfonylaminoethyl, 3-butylsulfonylaminoethyl, 4-tert-butylsulfonylaminoethyl, 5-pentylsulfonylaminoethyl, 6-hexylsulfonylaminoethyl, 1,1-dimethyl-2-methylsulfonylaminoethyl, 2-methyl-3-ethylsulfonylaminoethyl, N-methylsulfonylamino-N-acetylaminomethyl, and

- 32 -

the like.

The 1,3-dioxolanyl-substituted lower alkyl group having optionally a lower alkyl substituent includes a 1,3-dioxolanyl-substituted alkyl group wherein the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, which may optionally have 1 to 3 substituents of a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, (1,3-dioxolan-2-yl)methyl, 2-(1,3-dioxolan-4-yl)ethyl, 1-(1,3-dioxolan-2-yl)ethyl, 3-(1,3-dioxolan-4-yl)propyl, 4-(1,3-dioxolan-2-yl)butyl, 2-(1,3-dioxolan-2-yl)propyl, 5-(1,3-dioxolan-2-yl)pentyl, (4-hexyl-1,3-dioxolan-2-yl)-methyl, (2,4-dimethyl-1,3-dioxolan-2-yl)methyl, 6-(1,3-dioxolan-3-yl)hexyl, 4-(2-propyl-1,3-dioxolan-2-yl)butyl, 5-(4-butyl-1,3-dioxolan-2-yl)pentyl, 6-(2-pentyl-1,3-dioxolan-2-yl)hexyl, 1,1-dimethyl-2-(1,3-dioxolan-2-yl)ethyl, 2-methyl-3-(1,3-dioxolan-2-yl)propyl, (2-methyl-1,3-dioxolan-2-yl)methyl, 2-(4-ethyl-1,3-dioxolan-2-yl)ethyl, 3-(2,4,5-trimethyl-1,3-dioxolan-2-yl)propyl, and the like.

The alkanoyl-substituted lower alkyl group includes an alkanoylalkyl group wherein the alkanoyl moiety is a straight chain or branched chain alkanoyl group having 1 to 6 carbon atoms and the alkyl moiety is a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, formylmethyl, acetylmethyl, 2-propionylethyl, 1-butyrylethyl, 3-isobutyrylpropyl, 4-pentanoylbutyl, 5-hexanoylhexyl, 6-tert-butylcarbonylhexyl, 1,1-dimethyl-2-acetylethyl, 2-methyl-3-acetylmethyl, and the like.

The aminocarbonyl-substituted lower alkyl group which may optionally have a lower alkyl substituent includes a straight chain or branched chain alkyl group having 1 to 6 carbon atoms which is substituted by an aminocarbonyl having optionally 1 to 2 substituents of a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, aminocarbonylmethyl, 2-aminocarbonylethyl, 1-aminocarbonylethyl, 3-aminocarbonylpropyl, 4-aminocarbonylbutyl, 5-aminocarbonylpentyl, 6-aminocarbonylhexyl, 1,1-dimethyl-2-aminocarbonylethyl, 2-methyl-3-aminocarbonylpropyl, methylaminocarbonylmethyl, 1-ethylaminocarbonylethyl, 2-propylaminocarbonylethyl, 3-isopropylaminocarbonylpropyl, 4-butylaminocarbonylbutyl, 5-pentylaminocarbonylpentyl, 6-hexylaminocarbonylhexyl, dimethylaminocarbonylmethyl, 2-diethylaminocarbonylethyl, 2-dimethylamino-

- 33 -

carbonylethyl, (N-ethyl-N-propylamino)carbonylmethyl, 2-(N-methyl-N-hexyl - amino)carbonylethyl, and the like.

5 The lower alkoxy-carbonyl-substituted lower alkenyl group includes a straight chain or branched chain alkenyl group having 2 to 6 carbon atoms which is substituted by a straight chain or branched chain alkoxy - carbonyl group having 1 to 6 carbon atoms in the alkoxy moiety, for example, 2 - methoxycarbonylvinyl, 2-ethoxycarbonylvinyl, 3-propoxycarbonylallyl, 4-butoxy - carbonyl-2-butenyl, 4-pentyloxycarbonyl-3-butenyl, 3-hexyloxycarbonyl-1 - methylallyl, 5-isopropoxycarbonyl-2-pentenyl, 6-tert-butoxycarbonyl-2-hexenyl, 10 and the like.

The aminocarbonyl-substituted lower alkenyl group which may optionally have a lower alkyl substituent includes a straight chain or branched chain alkenyl group having 2 to 6 carbon atoms which is substituted by an aminocarbonyl group having optionally have 1 to 2 substituents of a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, 2 - 15 aminocarbonylvinyl, 3-aminocarbonylallyl, 4-aminocarbonyl-2-butenyl, 4 - aminocarbonyl-3-butenyl, 3-aminocarbonyl-1-methylallyl, 5-aminocarbonyl-2 - pentenyl, 6-aminocarbonyl-2-hexenyl, 2-methylaminocarbonylvinyl, 3-ethyl - aminocarbonylallyl, 4-propylaminocarbonyl-2-butenyl, 4-isopropylamino - 20 carbonyl-3-butenyl, 3-butylaminocarbonyl-1-methylallyl, 5-pentylamino - carbonyl-2-pentenyl, 6-hexylaminocarbonyl-2-hexenyl, 2-dimethylamino - carbonylvinyl, 2-diethylaminocarbonylvinyl, 3-(N-ethyl-N-propylaminocarbonyl) - allyl, 4-(N-methyl-N-hexylaminocarbonyl)-2-butenyl, and the like.

The carboxy-substituted lower alkenyl group includes a straight chain or branched chain alkenyl group having 2 to 6 carbon atoms, for 25 example, 2-carboxyvinyl, 3-carboxyallyl, 4-carboxy-2-butenyl, 4-carboxy-3 - butenyl, 3-carboxy-1-methylallyl, 5-carboxy-2-pentenyl, 6-carboxy-2-hexenyl, and the like.

The aminocarbonyl group having optionally a lower alkyl 30 substituent includes an aminocarbonyl group which may optionally have 1 to 2 substituents of a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, aminocarbonyl, methylaminocarbonyl, ethyl - aminocarbonyl, propylaminocarbonyl, isopropylaminocarbonyl, butyl-

- 34 -

aminocarbonyl, tert-butylaminocarbonyl, pentylaminocarbonyl, hexyl -
aminocarbonyl, dimethylaminocarbonyl, diethylaminocarbonyl, dipropyl -
aminocarbonyl, dibutylaminocarbonyl, dipentylaminocarbonyl, dihexyl -
aminocarbonyl, N-methyl-N-ethylaminocarbonyl, N-ethyl-N-propylamino -
5 carbonyl, N-methyl-N-butylaminocarbonyl, N-methyl-N-hexylaminocarbonyl,
and the like.

The phenylsulfonyl group having optionally a lower alkyl
substituent includes a phenylsulfonyl group having optionally 1 to 3
substituents of a straight chain or branched chain alkyl group having 1 to 6
10 carbon atoms, for example, phenylsulfonyl, 2-methyl phenylsulfonyl, 3 -
methylphenylsulfonyl, 4-methylphenylsulfonyl, 2-ethylphenylsulfonyl, 3 -
ethylphenylsulfonyl, 4-ethylphenylsulfonyl, 3-isopropylphenylsulfonyl, 4 -
hexylphenylsulfonyl, 3,4-dimethylphenylsulfonyl, 2,5-dimethylphenylsulfonyl,
3,4,5-trimethylphenylsulfonyl, and the like.

15 The phenyl-lower alkenyl group includes a phenylalkenyl group
wherein the alkenyl moiety is a straight chain or branched chain alkenyl group
having 2 to 6 carbon atoms, for example, styryl, cinnamyl, 4-phenyl-3-butenyl, 4 -
phenyl-2-butenyl, 5-phenyl-4-pentenyl, 5-phenyl-3-pentenyl, 5-phenyl-2 -
pentenyl, 6-phenyl-5-hexenyl, 6-phenyl-4-hexenyl, 6-phenyl-3-hexenyl, 6 -
20 phenyl-2-hexenyl, 2-methyl-4-phenyl-3-butenyl, 2-methyl-cinnamyl, 1-methyl -
cinnamyl, and the like.

The benzoyl group which may optionally have 1 to 3 substituents
selected from a lower alkoxy group, a halogen atom, an amino group having
optionally a lower alkanoyl substituent, and hydroxy group on the phenyl
25 moiety includes a benzoyl group which may optionally have 1 to 3 substituents
selected from a straight chain or branched chain alkoxy group having 1 to 6
carbon atoms, a halogen atom, an amino group having optionally a straight
chain or branched chain alkanoyl substituent having 1 to 6 carbon atoms and
hydroxy group on the phenyl moiety, for example, benzoyl, 2-chlorobenzoyl, 3 -
30 chlorobenzoyl, 4-chlorobenzoyl, 2-fluorobenzoyl, 3-fluorobenzoyl, 4-fluoro -
benzoyl, 2-bromobenzoyl, 3-bromobenzoyl, 4-bromobenzoyl, 2-iodobenzoyl, 4 -
iodobenzoyl, 3,5-dichlorobenzoyl, 2,6-dichlorobenzoyl, 3,4-dichlorobenzoyl,
3,4-difluorobenzoyl, 3,5-dibromobenzoyl, 3,4,5-trichlorobenzoyl, 2-methoxy-

- 35 -

benzoyl, 3-methoxybenzoyl, 4-methoxybenzoyl, 2-ethoxybenzoyl, 3-ethoxy -
 benzoyl, 4-ethoxybenzoyl, 4-isopropoxybenzoyl, 4-hexyloxybenzoyl, 3,4 -
 dimethoxybenzoyl, 3,4-diethoxybenzoyl, 3,4,5-trimethoxybenzoyl, 2,5 -
 dimethoxybenzoyl, 3-methoxy-4-chlorobenzoyl, 2-chloro-6-methoxybenzoyl, 2 -
 5 methoxy-5-chlorobenzoyl, 2-aminobenzoyl, 3-aminobenzoyl, 4-aminobenzoyl,
 2-hydroxybenzoyl, 3-hydroxybenzoyl, 4-hydroxybenzoyl, 2,5-diaminobenzoyl,
 3,4,5-triaminobenzoyl, 2-formylaminobenzoyl, 3-acetyaminobenzoyl, 4-acetyl -
 aminobenzoyl, 2-acetylaminobenzoyl, 3-proplonylaminobenzoyl, 4-butyryl -
 aminobenzoyl, 2-isobutyrylaminobenzoyl, 3-pentanoylaminobenzoyl, 3-tert -
 10 butylcarbonylaminobenzoyl, 4-hexanoylaminobenzoyl, 2,6-diacetyl amino -
 benzoyl, 2,4-dihydroxybenzoyl, 2,4,6-trihydroxybenzoyl, 2-hydroxy-5-chloro -
 benzoyl, and the like.

The amino-substituted lower alkanoyl group having optionally a
 lower alkanoyl substituent includes a straight chain or branched chain alkanoyl
 15 group having 2 to 6 carbon atoms which is substituted by an amino group
 having optionally 1 to 2 substituents of a straight chain or branched chain
 alkanoyl group having 1 to 6 carbon atoms, for example, 2-aminoacetyl, 3 -
 aminopropionyl, 2-aminopropionyl, 4-aminobutyryl, 5-aminopentanoyl, 6 -
 aminohexanoyl, 2,2-dimethyl-3-aminopropionyl, 2-methyl-3-aminopropionyl, 2 -
 20 acetyl aminoacetyl, 2-acetylaminopropionyl, 3-propionylaminopropionyl, 3 -
 isopropionylaminopropionyl, 4-butyrylaminobutyryl, 5-pentanoyl amino -
 pentanoyl, 6-hexanoylaminohexanoyl, 2-formylaminoacetyl, and the like.

The amino-substituted sulfonyl group having optionally a lower
 alkyl substituent includes an aminosulfonyl group which may optionally have 1
 25 to 2 substituents of a straight chain or branched chain alkyl group having 1 to 6
 carbon atoms, for example, aminosulfonyl, methylaminosulfonyl, ethyl amino -
 sulfonyl, propylaminosulfonyl, isopropylaminosulfonyl, butylaminosulfonyl, tert -
 butylaminosulfonyl, pentylaminosulfonyl, hexylaminosulfonyl, dimethyl amino -
 sulfonyl, diethylaminosulfonyl, dipropylaminosulfonyl, dibutylaminosulfonyl,
 30 dibutylaminosulfonyl, dipentylaminosulfonyl, dihexylaminosulfonyl, N-methyl-N -
 ethylaminosulfonyl, N-ethyl-N-propylaminosulfonyl, N-methyl-N-butyl amino -
 sulfonyl, N-methyl-N-hexylaminosulfonyl, and the like.

The lower alkeneldioxy group includes a straight chain or

- 36 -

branched chain alkylendioxy group having 1 to 4 carbon atoms, for example, methylenedioxy, ethylenedioxy, trimethylenedioxy, tetramethylenedioxy, and the like.

5 The phenyl group having optionally a lower alkoxy substituent includes a phenyl group which may optionally have 1 to 3 substituents of a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms, for example, phenyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 4-isopropoxyphenyl, 4-pentyl-
10 oxyphenyl, 2,4-dimethoxyphenyl, 4-hexyloxyphenyl, 3-ethoxy-4-methoxyphenyl, 2,3-dimethoxyphenyl, 3,4-dimethoxyphenyl, 3,4-diethoxyphenyl, 2,5-dimethoxyphenyl, 2,6-dimethoxyphenyl, 3,5-dimethoxyphenyl, 3,4-dipentyloxyphenyl, 3,4,5-trimethoxyphenyl, and the like.

The 2,3-dihydro-1H-indenyl-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and
15 silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring includes a straight chain or branched chain alkyl group having 1 to 6 carbon atoms which is substituted by a 2,3-dihydro-1H-indenyl group having optionally 1 to 3 substituents selected from oxo group, hydroxy group and a
20 silyloxy group having 3 substituents of a straight chain or branched chain alkyl group having 1 to 6 carbon atoms, for example, (2,3-dihydro-1H-inden-2-yl)-methyl, 2-(2,3-dihydro-1H-inden-1-yl)ethyl, 1-(2,3-dihydro-1H-inden-3-yl)ethyl, 3-(2,3-dihydro-1H-inden-4-yl)propyl, 4-(2,3-dihydro-1H-inden-5-yl)butyl, 5-(2,3-dihydro-1H-inden-6-yl)pentyl, 6-(2,3-dihydro-1H-inden-7-yl)hexyl, (1-oxo-2,3-dihydro-1H-inden-2-yl)methyl, (1-hydroxy-2,3-dihydro-1H-inden-2-yl)methyl, (1-
25 dimethyl,tert-butylsilyloxy-2,3-dihydro-1H-inden-2-yl)methyl, (1,3-dihydroxy-2,3-dihydro-1H-inden-2-yl)methyl, [1,3-bis(trimethylsilyloxy)-2,3-dihydro-1H-inden-2-yl)methyl, (1,3,7-trihydroxy-2,3-dihydro-1H-inden-2-yl)methyl, [1,3,4-tri-(dimethyl,ethylsilyloxy)-2,3-dihydro-1H-inden-2-yl)methyl, and the like.

30 The silyloxy group having a lower alkyl substituent includes a silyloxy group being substituted by three straight chain or branched chain alkyl groups having 1 to 6 carbon atoms, for example, trimethylsilyloxy, triethylsilyloxy, triisopropylsilyloxy, tributylsilyloxy, tri-tert-butylsilyloxy, tripentylsilyloxy, trihexylsilyloxy, dimethyl,tert-butylsilyloxy, and the like.

- 37 -

The phenyl group having optionally a substituent selected from a lower alkoxy group and a halogen atom on the phenyl ring includes a phenyl group which may optionally be substituted by 1 to 3 groups selected from a straight chain or branched chain alkoxy group having 1 to 6 carbon atoms and a halogen atom, for example, phenyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 4-isopropoxyphenyl, 4-pentyloxyphenyl, 2,4-dimethoxyphenyl, 4-hexyloxyphenyl, 3,4-dimethoxyphenyl, 3-ethoxy-4-methoxyphenyl, 2,3-dimethoxyphenyl, 3,4-diethoxyphenyl, 2,5-dimethoxyphenyl, 2,6-dimethoxyphenyl, 3,5-dimethoxyphenyl, 3,4-dipentyloxyphenyl, 3,4,5-trimethoxyphenyl, 2-chlorophenyl, 3-chlorophenyl, 4-chlorophenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2-bromophenyl, 3-bromophenyl, 4-bromophenyl, 2-iodophenyl, 3-iodophenyl, 4-iodophenyl, 3,4-dichlorophenyl, 3,5-dichlorophenyl, 2,6-dichlorophenyl, 2,3-dichlorophenyl, 2,4-dichlorophenyl, 3,4-difluorophenyl, 3,5-dibromophenyl, 3,4,5-trichlorophenyl, 2-methoxy-5-chlorophenyl, 3-chloro-4-methoxyphenyl, 3-methoxy-5-iodophenyl, 3,4-dimethoxy-5-bromophenyl, 3,5-iodo-4-methoxyphenyl, and the like.

The saturated or unsaturated 5- to 6-membered heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom includes, for example, pyrrolidinyl, piperidinyl, piperazinyl, morpholino, pyridyl, thienyl, pyrazinyl, pyrimidinyl, pyridazinyl, pyrrolyl, imidazolidinyl, pyrazolyl, imidazolyl, pyrazolidinyl, 1,3,4-oxadiazolyl, 1,2,4-triazolyl, 1,2,3,4-tetrazolyl, 1,3,4-triazolyl, 1,2,4-oxadiazolyl, furyl, pyrrolinyl, oxazolyl, isoxazolyl, thiazolyl, thiazolidinyl, 1,2,3,5-oxathiadiazolyl, isothiazolyl, pyranyl, pyrazolidinyl, 1,2,4-triazinyl, and the like.

The lower alkyl group substituted by a 5- to 6-membered saturated or unsaturated heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom includes a straight chain or branched chain alkyl group having 1 to 6 carbon atoms which is substituted by the above mentioned heterocyclic group, for example, pyrrolidinylmethyl, 2-piperidinylethyl, 3-piperazinylpropyl, 4-morpholinobutyl, (2-pyridyl)methyl, (3-pyridyl)methyl, (2-thienyl)methyl, 2-(3-pyrazinyl)ethyl, 1-(2-pyrimidyl)ethyl, 3-(3-pyridazinyl)propyl, 4-(2-pyrrolyl)butyl, 4-(4-imidazolidinyl)butyl, (2-imidazolyl)-

- 38 -

methyl, (3-pyrazolyl)methyl, 2-(2-imidazolyl)ethyl, 3-(3-pyrazolidinyl)propyl,
 thienylmethyl, 3-(2-imidazolyl)propyl, 4-(2-pyrrolinyl)butyl, (2-furyl)methyl, (4 -
 oxazolyl)methyl, (5-oxazolyl)methyl, 5-(4-oxazolyl)pentyl, 6-(3-isooxazolyl) -
 hexyl, (4-thiazolyl)methyl, (2-thiazolyl)methyl, 2-(3-isothiazolyl)ethyl, (2-pyranyl) -
 5 methyl, 3-(3-pyrazolidinyl)propyl, 4-(2-pyrazolyl)butyl, (5-thiazolyl)methyl,
 (1,3,4-oxadiazolin-5-yl)methyl, (1,2,4-triazol-5-yl)methyl, (1,2,3,4-tetrazol-5-yl) -
 methyl, (1,3,4-triazol-5-yl)methyl, (1,2,4-oxadiazol-5-yl)methyl, (1,2,4-triazin-3 -
 yl)methyl, (thiazolidin-5-yl)methyl, (1,2,3,5-oxathiadiazolin-4-yl)methyl, (2-furyl) -
 methyl, (3-furyl)methyl, 2-(5-thiazolyl)ethyl, 1-(1,3,4-oxadiazolin-2-yl)ethyl, 3 -
 10 (1,2,4-triazol-3-yl)propyl, 4-(1,2,3,4-tetrazol-5-yl)butyl, 6-(1,3,4-triazol-2-yl) -
 hexyl, 2-(1,2,4-oxadiazol-3-yl)ethyl, 1-(1,2,4-triazin-5-yl)ethyl, 3-(thiazolidin-2 -
 yl)propyl, 4-(1,2,3,5-oxathiadiazolin-4-yl)butyl, and the like.

The lower alkenyl group substituted by a 5- to 14-membered
 saturated or unsaturated heteromonocyclic, heterobicyclic or heterotricyclic
 15 group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom
 and sulfur atom includes the above mentioned heterocyclic group-substituted
 alkenyl group wherein the alkenyl moiety is a straight chain or branched chain
 alkenyl group with 1 to 2 double bonds having 2 to 6 carbon atoms, for
 example, 2-benzofurylvinyl, 3-benzofuryl-2-propenyl, 4-benzofuryl-3-butenyl, 3 -
 20 benzofuryl-2-butenyl, 2-methyl-3-benzofuryl-2-propenyl, 5-benzofuryl-4 -
 petenyl, 5-benzofuryl-2-pentenyl, 4-benzofuryl-3-pentenyl, 6-benzofuryl-5 -
 hexenyl, 6-benzofuryl-4-hexenyl, 6-benzofuryl-3-hexenyl, 6-benzofuryl-2 -
 hexenyl, β -methyl-4-benzofuryl-3-butenyl, 5-benzofuryl-2,4-pentadienyl, 4 -
 benzofuryl-1,3-butadienyl, 6-benzofuryl-2,4-hexadienyl, 6-benzofuryl-3,5 -
 25 hexadienyl, 6-benzofuryl-1,3-hexadienyl, 5-benzofuryl-1,3-pentadienyl, 2 -
 benzothienylvinyl, 3-benzothienyl-2-propenyl, 4-benzothienyl-3-butenyl, 3 -
 benzothienyl-2-butenyl, 2-methyl-3-benzothienyl-2-propenyl, 5-benzothienyl-4 -
 petenyl, 5-benzothienyl-2-pentenyl, 6-benzothienyl-5-hexenyl, 6-benzothienyl -
 4-hexenyl, 6-benzothienyl-3-hexenyl, 6-benzothienyl-2-hexenyl, β -methyl-4 -
 30 benzothienyl-3-butenyl, 5-benzothienyl-2,4-pentadienyl, 4-benzothienyl-1,3 -
 butadienyl, 6-benzothienyl-2,4-hexadienyl, 6-benzothienyl-3,5-hexadienyl, 6-
 benzothienyl-1,3-hexadienyl, 5-benzothienyl-1,3-pentadienyl, 2-(furo[3,2-c]-

- 39 -

- pyridyl)vinyl, 3-(furo[3,2-c]pyridyl)-2-propenyl, 4-(furo[3,2-c]pyridyl)-3-butenyl, 3 -
 (furo[3,2-c]pyridyl)-2-butenyl, 2-methyl-3-(furo[3,2-c]pyridyl)-2-propenyl, 5 -
 (furo[3,2-c]pyridyl)-4-petenyl, 5-(furo[3,2-c]pyridyl)-2-pentenyl, 6-(furo[3,2 -
 c]pyridyl)-5-hexenyl, 6-(furo[3,2-c]pyridyl)-4-hexenyl, 6-(furo[3,2-c]pyridyl)-3 -
 5 hexenyl, 6-(furo[3,2-c]pyridyl)-2-hexenyl, β -methyl-4-(furo[3,2-c]pyridyl)-3 -
 butenyl, 5-(furo[3,2-c]pyridyl)-2,4-pentadienyl, 4-(furo[3,2-c]pyridyl)-1,3 -
 butadienyl, 6-(furo[3,2-c]pyridyl)-2,4-hexadienyl, 6-(furo[3,2-c]pyridyl)-3,5 -
 hexadienyl, 6-(furo[3,2-c]pyridyl)-1,3-hexadienyl, 5-(furo[3,2-c]pyridyl)-1,3 -
 pentadienyl, 2-quinolylvinyl, 3-(1,4-dihydroquinolyl)-2-propenyl, 4-benzo -
 10 thiazolyl-3-butenyl, 3-carbostyryl-2-butenyl, 2-methyl-3-(3,4-dihydrocarbostyryl) -
 2-propenyl, 5-(1,2,3,4-tetraquinolyl)-4-petenyl, 5-indolyl-2-pentenyl, 6-indolyl -
 5-hexenyl, 6-indolyl-4-hexenyl, 6-benzoimidazolyl-3-hexenyl, 6-benzoxazolyl -
 2-hexenyl, β -methyl-4-isoquinolyl-3-butenyl, 5-quinazolidinyl-2,4-pentadienyl,
 4-cinnolyl-1,3-butadienyl, 6-quinoxalyl-2,4-hexadienyl, 6-phthalazinyl-3,5 -
 15 hexadienyl, 6-chromanyl-1,3-hexadienyl, 5-isoindolyl-1,3-pentadienyl, 2-(4H -
 chromenyl)vinyl, 3-(2,3-dihydro-2-benzofuryl)-2-propenyl, 4-(2-perhydrobenzo -
 furyl)-3-butenyl, 3-(1,4-benzoxadinyl)-2-butenyl, 2-methyl-3-(3,4-dihydro-2H -
 1,4-benzoxazinyl)-2-propenyl, 5-(1,4-benzothiazinyl)-4-pentenyl, 5-(1,2,3,4 -
 tetrahydroquinoxalyl)-2-pentenyl, 6-(1,3-dithia-2,4-dihydronaphthalenyl)-5 -
 20 hexenyl, 6-(1,4-dithianaphthalenyl)-4-hexenyl, 6-(1,4-benzodioxanyl)-3 -
 hexenyl, 2-pyrrolidinylvinyl, 3-pyrrolidinyl-2-propenyl, 4-pyrrolidinyl-3-butenyl,
 3-pyrrolidinyl-2-butenyl, 2-methyl-3-pyrrolidinyl-2-propenyl, 5-pyrrolidinyl-4 -
 pentenyl, 5-pyrrolidinyl-2-pentenyl, 6-pyrrolidinyl-5-hexenyl, 6-pyrrolidinyl-4 -
 hexenyl, 6-pyrrolidinyl-3-hexenyl, 6-pyrrolidinyl-2-hexenyl, β -methyl-4 -
 25 pyrrolidinyl-3-butenyl, 5-pyrrolidinyl-2,4-pentadienyl, 4-pyrrolidinyl-1,3 -
 butadienyl, 6-pyrrolidinyl-2,4-hexadienyl, 6-pyrrolidinyl-3,5-hexadienyl, 6 -
 pyrrolidinyl-1,3-hexadienyl, 5-pyrrolidinyl-1,3-pentadienyl, 2-piperidinylvinyl, 3 -
 piperidinyl-2-propenyl, 4-piperidinyl-3-butenyl, 3-piperidinyl-2-butenyl, 2 -
 methyl-3-piperidinyl-2-propenyl, 5-piperidinyl-4-pentenyl, 5-piperidinyl-2 -
 30 pentenyl, 6-piperidinyl-5-hexenyl, 5-piperidinyl-2-pentenyl, 6-piperidinyl-5 -
 hexenyl, 6-piperidinyl-4-hexenyl, 6-piperidinyl-3-hexenyl, 6-piperidinyl-2-

- 40 -

- hexenyl, β -methyl-4-piperidinyl-3-butenyl, 5-piperidinyl-2,4-pentadienyl, 4 -
 piperidinyl-1,3-butadienyl, 6-piperidinyl-2,4-hexadienyl, 6-piperidinyl-3,5 -
 hexadienyl, 6-piperidinyl-1,3-hexadienyl, 5-piperidinyl-1,3-pentadienyl, 2 -
 piperazinylvinyl, 3-piperazinyl-2-propenyl, 4-piperazinyl-3-butenyl, 3 -
 5 piperazinyl-2-butenyl, 2-methyl-3-piperazinyl-2-propenyl, 5-piperazinyl-4 -
 pentenyl, 5-piperazinyl-2-pentenyl, 6-piperazinyl-5-hexenyl, 6-piperazinyl-4 -
 hexenyl, 6-piperazinyl-3-hexenyl, 6-piperazinyl-2-hexenyl, β -methyl-4 -
 piperazinyl-3-butenyl, 5-piperazinyl-2,4-pentadienyl, 4-piperazinyl-1,3 -
 butadienyl, 6-piperazinyl-2,4-hexadienyl, 6-piperazinyl-3,5-hexadienyl, 6 -
 10 piperazinyl-1,3-hexadienyl, 5 piperazinyl-1,3-pentadienyl, 2-morpholinovinyl, 3 -
 pyridyl-2-propenyl, 4-thienyl-3-butenyl, 3-pyridinyl-2-butenyl, 2-methyl-3 -
 pyrimidyl-2-propenyl, 2-pyridazinylvinyl, 3-pyrrolyl-2-propenyl, 4-imidazolyl-3 -
 butenyl, 3-imidazolyl-2-butenyl, 2-methyl-3-imidazolyl-2-propenyl, 5-imidazolyl -
 4-pentenyl, 5-imidazolyl-2-pentenyl, 6-imidazolyl-5-hexenyl, 6-imidazolyl-4 -
 15 hexenyl, 6-imidazolyl-3-hexenyl, 6-imidazolyl-2-hexenyl, β -methyl-4-imidazolyl -
 3-butenyl, 5-imidazolyl-2,4-pentadienyl, 4-imidazolyl-1,3-butadienyl, 6 -
 imidazolyl-2,4-hexadienyl, 6-imidazolyl-3,5-hexadienyl, 6-imidazolyl-1,3 -
 hexadienyl, 5-imidazolyl-1,3-pentadienyl, 2-imidazolidinylvinyl, 3-pyrazolyl-1,3 -
 pentadienyl, 2-imidazolidinylvinyl, 3-pyrazolyl-2-propenyl, 4-pyrazolidinyl-3 -
 20 butenyl, 3-perhydrobenzofuryl-2-butenyl, 2-methyl-3-(1,3,4-oxadiazolyl)-2 -
 propenyl, 5-(1,2,4-triazolyl)-4-pentenyl, 5-(1,2,3,4-tetrazolyl)-2-pentenyl, 6-(1,3,4 -
 triazolyl)-5-hexenyl, 6-(1,2,4-oxadiazolyl)-4-hexenyl, 6-(2,3-dihydro-2 -
 benzofuryl)-3-hexenyl, 6-pyrrolinyl-2-hexenyl, β -methyl-5-nonyl-3-butenyl, 5 -
 isoxazolyl-2,4-pentadienyl, 4-thiazolyl-1,3-butadienyl, 6-thiazolidinyl-2,4 -
 25 hexadienyl, 6-(1,2,3,5-oxathiadiazolyl)-3,5-hexadienyl, 6-isothiazolyl-1,3 -
 hexadienyl, 5-pyranyl-1,3-pentadienyl, 2-oxazolylvinyl, 3-oxazolyl-2-propenyl,
 4-oxazolyl-3-butenyl, 3-oxazolyl-2-butenyl, 2-methyl-3-oxazolyl-2-propenyl, 5 -
 oxazolyl-4-pentenyl, 5-oxazolyl-2-pentenyl, 4-oxazolyl-3-pentenyl, 6-oxazolyl-5 -
 hexenyl, 6-oxazolyl-4-hexenyl, 6-oxazolyl-3-hexenyl, 6-oxazolyl-2-hexenyl, β -
 30 methyl-4-oxazolyl-3-butenyl, 5-oxazolyl-2,4-pentadienyl, 4-oxazolyl-1,3 -
 butadienyl, 6-oxazolyl-2,4-hexadienyl, 6-oxazolyl-3,5-hexadienyl, 6-oxazolyl-

- 41 -

1,3-hexadienyl, 5-oxazolyl-1,3-pentadienyl, 2-pyrazolylvinyl, 3-quinuclidinyl-2 -
 propenyl, 4-benzothiazolyl-3-butenyl, 3-carbostyryl-2-butenyl, 2-methyl-3-(3,4 -
 dihydro[2,3-g]quinolyl)-2-propenyl, 5-(1,2,3,4-tetrahydrofuro[2,3-g]quinolyl)-4 -
 pentenyl, 2-(naphtho[2,1-b]furyl)vinyl, 3-(naphtho[2,1-b]furyl)-2-propenyl, 4 -
 5 (naphtho[2,1-b]furyl)-3-butenyl, 3-(naphtho[2,1-b]furyl)-2-butenyl, 2-methyl-3 -
 (naphtho[2,1-b]furyl)-2-propenyl, 5-(naphtho[2,1-b]furyl)-4-pentenyl, 5-(naphtho -
 [2,1-b]furyl)-2-pentenyl, 4-(naphtho[2,1-b]furyl)-3-pentenyl, 6-(naphtho[2,1-b] -
 furyl)-5-hexenyl, 6-(naphtho[2,1-b]furyl)-4-hexenyl, 6-(naphtho[2,1-b]furyl)-3 -
 hexenyl, 6-(naphtho[2,1-b]furyl)-2-hexenyl, β -methyl-4-(naphtho[2,1-b]furyl)-3 -
 10 butenyl, 5-(naphtho[2,1-b]furyl)-2,4-pentadienyl, 4-(naphtho[2,1-b]furyl)-1,3 -
 butadienyl, 6-(naphtho[2,1-b]furyl)-2,4-hexadienyl, 6-(naphtho[2,1-b]furyl)-3,5 -
 hexadienyl, 6-(naphtho[2,1-b]furyl)-1,3-hexadienyl, 5-(naphtho[2,1-b]furyl)-1,3 -
 pentadienyl, 2-(imidazo[1,2-a]pyridyl)vinyl, 3-(imidazo[1,2-a]pyridyl)-2 -
 propenyl, 4-(imidazo[1,2-a]pyridyl)-3-butenyl, and the like.

15 The phenyl-lower alkoxycarbonyl group includes a phenylalkoxy -
 carbonyl group wherein the alkoxycarbonyl moiety is a straight chain or
 branched chain alkoxycarbonyl group having 1 to 6 carbon atoms in the alkoxy
 moiety, for example, benzyloxycarbonyl, 2-phenylethoxycarbonyl, 1-phenyl -
 ethoxycarbonyl, 3-phenylpropoxycarbonyl, 4-phenylbutoxycarbonyl, 5-phenyl -
 20 pentyloxycarbonyl, 6-phenylhexyloxycarbonyl, 1,1-dimethyl-2-phenylethoxy -
 carbonyl, 2-methyl-3-phenylpropoxycarbonyl, and the like.

The lower alkoxycarbonyloxy-substituted lower alkyl group
 includes a straight chain or branched chain alkyl group having 1 to 6 carbon
 atoms, which is substituted by alkoxycarbonyloxy group wherein the alkoxy
 25 moiety is a a straight chain or branched chain alkoxy group having 1 to 6
 carbon atoms , for example, methoxycarbonyloxymethyl, ethoxycarbonyloxy -
 methyl, 2-ethoxycarbonyloxyethyl, 1-ethoxycarbonyloxyethyl, 3-methoxy -
 carbonyloxypropyl, 4-ethoxycarbonyloxybutyl, 6-propoxycarbonyloxyhexyl, 5 -
 isopropoxycarbonyloxypropyl, 1,1-dimethyl-2-butoxycarbonyloxyethyl, 2-methyl -
 30 3-tert-butoxycarbonyloxypropyl, 2-pentyloxycarbonyloxyethyl, hexyloxy -
 carbonyloxymethyl, and the like.

The benzoyl-substituted lower alkyl group having optionally a

- 42 -

halogen substituent on the phenyl ring includes a straight chain or branched chain alkyl group having 1 to 6 carbon atom, which is substituted by a benzoyl group wherein the phenyl ring may optionally have 1 to 3 halogen substituents, for example, benzoylmethyl, 1-(2-chlorobenzoyl)ethyl, 2-(3-chlorobenzoyl) -
5 ethyl, 3-(4-chlorobenzoyl)propoyl, 4-(2-fluorobenzoyl)butyl, 1,1-dimethyl-2-(3 - fluorobenzoyl)ethyl, 5-(4-fluorobenzoyl)pentyl, 6-(2-bromobenzoyl)hexyl, 2 - methyl-3-(3-bromobenzoyl)propyl, (4-bromobenzoyl)methyl, 2-(2-iodobenzoyl) - ethyl, 1-(4-iodobenzoyl)ethyl, (3,5-dichlorobenzoyl)methyl, 2-(2,6-dichloro - benzoyl)ethyl, 1-(3,4-dichlorobenzoyl)ethyl, 3-(3,4-difluorobenzoyl)propyl, (3,5 -
10 dibromobenzoyl)methyl, (3,4,5-trichlorobenzoyl)methyl, and the like.

The amino group having optionally a lower alkanoyl substituent includes an amino group which may optionally have a substituent of a straight chain or branched chain alkanoyl group having 1 to 6 carbon atoms, for example, amino, formylamino, acetylamino, propionylamino, butyrylamino,
15 isobutyrylamino, pentanoylamino, t-butylcarbonylamino, hexanoylamino, and the like.

The present invention specifically includes the following compounds.

- 20 (1) A quinoxaline derivative of the formula (1) wherein R¹ is hydrogen atom and R², R³, R⁴, m, n and r are the same as defined above, or a salt thereof.
- (2) A quinoxaline derivative of the formula (1) wherein R¹ is a halogen atom and R², R³, R⁴, m, n and r are the same as defined above, or a salt thereof.
- 25 (3) A quinoxaline derivative of the formula (1) wherein R¹ is a lower alkyl group and R², R³, R⁴, m, n and r are the same as defined above, or a salt thereof.
- (4) A quinoxaline derivative of the formula (1) wherein R² is hydrogen atom and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt
30 thereof.
- (5) A quinoxaline derivative of the formula (1) wherein R² is a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

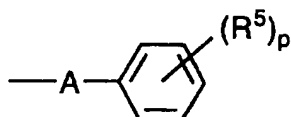
- 43 -

(6) A quinoxaline derivative of the formula (1) wherein R² is phenyl group and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

5 (7) A quinoxaline derivative of the formula (1) wherein R² is a morpholino-substituted lower alkyl group and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(8) A quinoxaline derivative of the formula (1) wherein R² is an imidazolyl-substituted lower alkyl group and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

10 (9) A quinoxaline derivative of the formula (1) wherein R³ is hydrogen atom, R⁴ is a group of the formula:



15 (wherein A, R⁵ and p are the same as defined above),
and R¹, R² and r are the same as defined above, or a salt thereof.

(10) A quinoxaline derivative of the formula (1) wherein R³ is a lower alkyl group, R⁴ is a group of the formula:



(wherein A, R⁵ and p are the same as defined above),
and R¹, R² and r are the same as defined above, or a salt thereof.

25 (11) A quinoxaline derivative of the formula (1) wherein R³ is hydrogen atom, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula:
30 -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R², m, n and r are the same as defined above, or

- 44 -

a salt thereof.

(12) A quinoxaline derivative of the formula (1) wherein R³ is a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy -
5 substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above),
10 a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(13) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the
15 same as defined above, or a salt thereof.

(14) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkyl group, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(15) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.
20

(16) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(17) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.
25

(18) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.
30

(19) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m,

- 45 -

n and r are the same as defined above, or a salt thereof.

(20) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(21) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(22) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

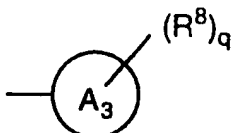
(23) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(24) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(25) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a phenoxy-substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(26) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(27) A quinoxaline derivative of the formula (1), wherein R³ is hydrogen atom, R⁴ is a group of the formula:



(wherein the symbols are the same as defined above), and R¹, R², m, n and r

- 46 -

are the same as defined above, or a salt thereof.

(28) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkyl group, R^4 is a group of the formula:



(in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

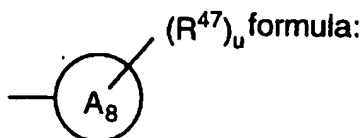
(29) A quinoxaline derivative of the formula (1), wherein R^3 is hydrogen atom, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(30) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(31) A quinoxaline derivative of the formula (1), wherein R^3 is hydrogen atom, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(32) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(33) A quinoxaline derivative of the formula (1), wherein R^3 is hydrogen atom, R^4 is a group of the

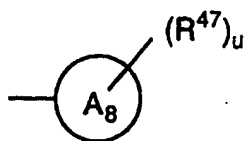


- 47 -

(in which the symbols are the same as defined above),

and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(34) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkyl group, R^4 is a group of the formula:

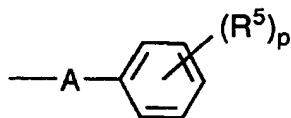


(in which the symbols are the same as defined above),

and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(35) A quinoxaline derivative of the formula (1), wherein R^3 and R^4 combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(36) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is hydrogen atom, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:



(in which A , R^5 and p are the same as defined above),

and m , n and r are the same as defined above, or a salt thereof.

(37) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkenyl group, R^2 is hydrogen atom, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m , n and r are the same as

- 48 -

defined above, or a salt thereof.

(38) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

(39) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(40) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(41) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(42) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n, and r are the same as defined above, or a salt thereof.

(43) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

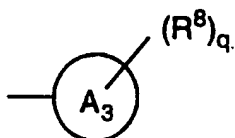
(44) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(45) A quinoxaline derivative of the formula (1), wherein R¹ is a

- 49 -

halogen atom or a lower alkyl group, R^2 is hydrogen atom, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenoxy-substituted lower alkyl group, and m , n and r are the same as defined above, or a salt thereof.

(46) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is hydrogen atom, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:

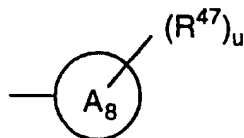


(in which the symbols are the same as defined above), and m , n and r are the same as defined above, or a salt thereof.

(47) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is hydrogen atom, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and m , n and r are the same as defined above, or a salt thereof.

(48) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is hydrogen atom, R^3 is hydrogen atom or a lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3 - dihydro-1H-indenyl ring, and m , n and r are the same as defined above, or a salt thereof.

(49) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is hydrogen atom, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:



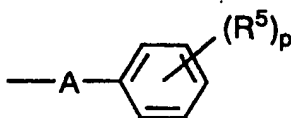
(in which the symbols are the same as defined above), and m , n and r are the same as defined above, or a salt thereof.

(50) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is hydrogen atom, R^3 and R^4 combine

- 50 -

together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.

- (51) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



10

(in which A, R⁵ and p are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

- (52) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

- (53) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

- (54) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

30

- 51 -

5 (55) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

10 (56) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

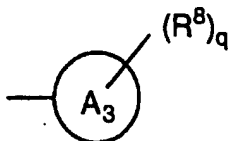
15 (57) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety and m, n and r are the same as defined above, or a salt thereof.

20 (58) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

25 (59) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

30 (60) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

- 52 -

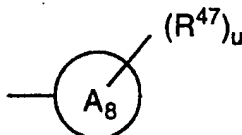


(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(61) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(62) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

(63) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



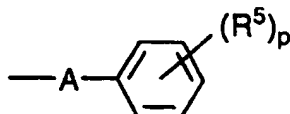
(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(64) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a lower alkyl group having optionally a halogen substituent, R³ and R⁴ combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group, and m, n and r are the same as defined above, or a salt thereof.

(65) A quinoxaline derivative of the formula (1), wherein R¹ is a

- 53 -

halogen atom or a lower alkyl group, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



5

(in which A, R⁵ and p are the same as defined above),

and m, n and r are the same as defined above, or a salt thereof.

(66) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

(67) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

(68) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(69) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(70) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is phenyl group, R³ is hydrogen atom

- 54 -

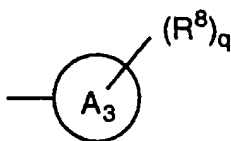
or a lower alkyl group, R^4 is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m , n and r are the same as defined above, or a salt thereof.

(71) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety and m , n and r are the same as defined above, or a salt thereof.

(72) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m , n and r are the same as defined above, or a salt thereof.

(73) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenoxy-substituted lower alkyl group, and m , n and r are the same as defined above, or a salt thereof.

(74) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:



(in which the symbols are the same as defined above), and m , n and r are the same as defined above, or a salt thereof.

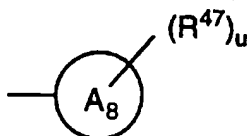
(75) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and m , n and r are the same as defined above, or a salt thereof.

(76) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower

- 55 -

alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3 - dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

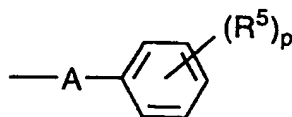
- 5 (77) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

- (78) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is phenyl group, R³ and R⁴ combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.

- 15 (79) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which A, R⁵ and p are the same as defined above),

- 25 and m, n and r are the same as defined above, or a salt thereof.

- (80) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl - carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy
- 30

- 56 -

group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m , n and r are the same as defined above, or a salt thereof.

5 (81) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a lower alkenyl group, and m , n and r are the same as defined above, or a salt thereof.

10 (82) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a cycloalkyl-lower alkyl group, and m , n and r are the same as defined above, or a salt thereof.

15 (83) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a naphthyl-lower alkyl group, and m , n and r are the same as defined above, or a salt thereof.

20 (84) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenylthio - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m , n and r are the same as defined above, or a salt thereof.

25 (85) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenylsulfinyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety and m , n and r are the same as defined above, or a salt thereof.

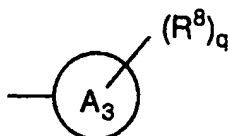
30 (86) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenylsulfonyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m , n and r are the same as defined

- 57 -

above, or a salt thereof.

(87) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(88) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

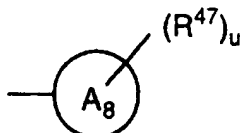


(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(89) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(90) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

(91) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



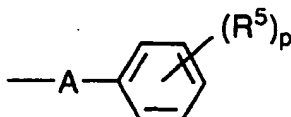
(in which the symbols are the same as defined above), and m, n and r are the

- 58 -

same as defined above, or a salt thereof.

(92) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is a morpholino-substituted lower alkyl group, R³ and R⁴ combine together with the nitrogen atom to form 1,2,3,4 - tetrahydroisoquinolyl group which may optionally have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.

(93) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which A, R⁵ and p are the same as defined above),

and m, n and r are the same as defined above, or a salt thereof.

(94) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl - carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

(95) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

(96) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl

- 59 -

group, and m, n and r are the same as defined above, or a salt thereof.

(97) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(98) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylthio - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

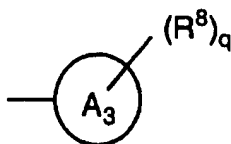
(99) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfinyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety and m, n and r are the same as defined above, or a salt thereof.

(100) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(101) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(102) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

- 60 -

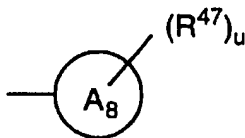


(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(103) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(104) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

(105) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

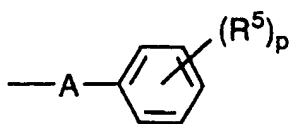


(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(106) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group, R² is an imidazolyl-substituted lower alkyl group, R³ and R⁴ combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.

(107) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is hydrogen atom, R⁴ is a group of the formula:

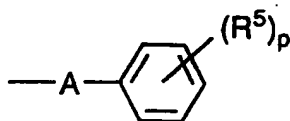
- 61 -



(wherein A, R⁵ and p are the same as defined above),

and R², m, n and r are the same as defined above, or a salt thereof.

(108) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is a lower alkyl group, R⁴ is a group of the formula:



(wherein A, R⁵ and p are the same as defined above),

and R², m, n and r are the same as defined above, or a salt thereof.

(109) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is hydrogen atom, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R², m, n and r are the same as defined above, or a salt thereof.

(110) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl-carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R², m, n and r

- 62 -

are the same as defined above, or a salt thereof.

(111) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is hydrogen atom, R⁴ is a lower alkenyl group, and R², m, n and r are the same as defined above, or a salt thereof.

5 (112) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is a lower alkyl group, R⁴ is a lower alkenyl group, and R², m, n and r are the same as defined above, or a salt thereof.

(113) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is hydrogen atom, R⁴ is a cycloalkyl-lower alkyl group, and
10 R², m, n and r are the same as defined above, or a salt thereof.

(114) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and R², m, n and r are the same as defined above, or a salt thereof.

(115) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is hydrogen atom, R⁴ is a naphthyl-lower alkyl group, and
15 R², m, n and r are the same as defined above, or a salt thereof.

(116) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and R², m, n and r are the same as defined above, or a salt thereof.

20 (117) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is hydrogen atom, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R², m, n and r are the same as defined above, or a salt thereof.

(118) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is a lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl
25 moiety, and R², m, n and r are the same as defined above, or a salt thereof.

(119) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is hydrogen atom, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl
30 moiety, and R², m, n and r are the same as defined above, or a salt thereof.

(120) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ is a lower alkyl group, R⁴ is a phenylsulfinyl-substituted

- 63 -

lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R^2 , m , n and r are the same as defined above, or a salt thereof.

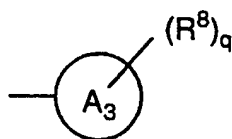
(121) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is hydrogen atom, R^4 is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R^2 , m , n and r are the same as defined above, or a salt thereof.

(122) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is a lower alkyl group, R^4 is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R^2 , m , n and r are the same as defined above, or a salt thereof.

(123) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is hydrogen atom, R^4 is a phenoxy-substituted lower alkyl group, and R^2 , m , n and r are the same as defined above, or a salt thereof.

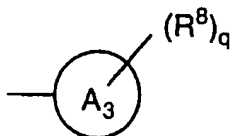
(124) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is a lower alkyl group, R^4 is a phenoxy-substituted lower alkyl group, and R^2 , m , n and r are the same as defined above, or a salt thereof.

(125) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is hydrogen atom, R^4 is a group of the formula:



(wherein the symbols are the same as defined above), and R^2 , m , n and r are the same as defined above, or a salt thereof.

(126) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is a lower alkyl group, R^4 is a group of the formula:



(wherein the symbols are the same as defined above), and R^2 , m , n and r are the same as defined above, or a salt thereof.

(127) A quinoxaline derivative of the formula (1), wherein R^1 is

- 64 -

hydrogen atom, R^3 is hydrogen atom, R^4 is a group of the formula:

$-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^2 , m , n and r are the same as defined above, or a salt thereof.

(128) A quinoxaline derivative of the formula (1), wherein R^1 is

5 hydrogen atom, R^3 is a lower alkyl group, R^4 is a group of the formula:

$-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^2 , m , n and r are the same as defined above, or a salt thereof.

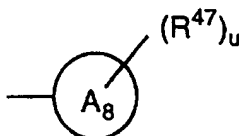
(129) A quinoxaline derivative of the formula (1), wherein R^1 is

10 hydrogen atom, R^3 is hydrogen atom, R^4 is a 2,3-dihydro-1H-indenyl group - substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^2 , m , n and r are the same as defined above, or a salt thereof.

(130) A quinoxaline derivative of the formula (1), wherein R^1 is

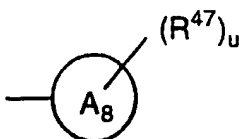
15 hydrogen atom, R^3 is a lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group - substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^2 , m , n and r are the same as defined above, or a salt thereof.

20 (131) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is hydrogen atom, R^4 is a group of the formula:



25 (in which the symbols are the same as defined above), and R^2 , m , n and r are the same as defined above, or a salt thereof.

(132) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom, R^3 is a lower alkyl group, R^4 is a group of the formula:



30

(in which the symbols are the same as defined above), and R^2 , m , n and r are the same as defined above, or a salt thereof.

- 65 -

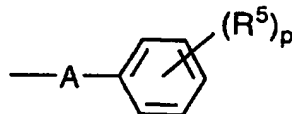
(133) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom, R³ and R⁴ combine together with the nitrogen atom to form 1,2,3,4-tetrahydroquinolyl group which may optionally have a lower alkoxy group), and R², m, n and r are the same as defined above, or a salt thereof.

5 (134) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group and R², R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(135) A quinoxaline derivative of the formula (1), wherein R¹ is an amino group having optionally a lower alkyl substituent and R², R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

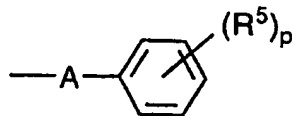
(136) A quinoxaline derivative of the formula (1), wherein R¹ is an aminocarbonyl group having optionally a lower alkyl substituent and R², R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

15 (137) A quinoxaline derivative of the formula (1), wherein R³ is a phenyl - lower alkoxy carbonyl group and R⁴ is a group of the formula:



(in which A, R⁵ and p are the same as defined above), and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(138) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyloxy-substituted lower alkyl group and R⁴ is a group of the formula:



(in which A, R⁵ and p are the same as defined above), and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(139) A quinoxaline derivative of the formula (1), wherein R³ is a phenyl - lower alkoxy carbonyl group and R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl ring selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having

- 66 -

optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(140) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group and R^4 is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl ring selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl - carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(141) A quinoxaline derivative of the formula (1), wherein R^3 is a phenyl - lower alkoxycarbonyl group and R^4 is a lower alkenyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(142) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group and R^4 is a lower alkenyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(143) A quinoxaline derivative of the formula (1), wherein R^3 is a phenyl - lower alkoxycarbonyl group and R^4 is a cycloalkyl-lower alkyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(144) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group and R^4 is a cycloalkyl-lower alkyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(145) A quinoxaline derivative of the formula (1), wherein R^3 is a phenyl - lower alkoxycarbonyl group and R^4 is a naphthyl-lower alkyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(146) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group and R^4 is a naphthyl-lower alkyl

- 67 -

group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(147) A quinoxaline derivative of the formula (1), wherein R³ is a phenyl - lower alkoxycarbonyl group and R⁴ is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl ring, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(148) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyloxy-substituted lower alkyl group and R⁴ is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl ring, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(149) A quinoxaline derivative of the formula (1), wherein R³ is a phenyl - lower alkoxycarbonyl group and R⁴ is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl ring, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(150) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyloxy-substituted lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(151) A quinoxaline derivative of the formula (1), wherein R³ is a phenyl - lower alkoxycarbonyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(152) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyloxy-substituted lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(153) A quinoxaline derivative of the formula (1), wherein R³ is a phenyl - lower alkoxycarbonyl group, R⁴ is a phenoxy-substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

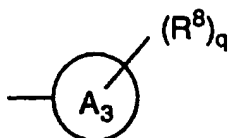
(154) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyloxy-substituted lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt

- 68 -

thereof.

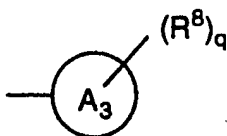
(155) A quinoxaline derivative of the formula (1), wherein R^3 is a phenyl - lower alkoxycarbonyl group, R^4 is a group of the formula:

5



(wherein the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

10 (156) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group, R^4 is a group of the formula:



15 (in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(157) A quinoxaline derivative of the formula (1), wherein R^3 is a phenyl - lower alkoxycarbonyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

20 (158) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

25 (159) A quinoxaline derivative of the formula (1), wherein R^3 is a phenyl - lower alkoxycarbonyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

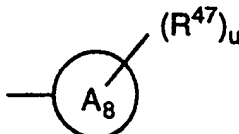
30 (160) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower

- 69 -

alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(161) A quinoxaline derivative of the formula (1), wherein R^3 is a phenyl - lower alkoxycarbonyl group, R^4 is a group of the formula:

5

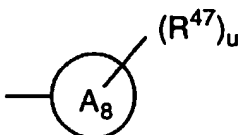


(in which the symbols are the same as defined above),

and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

10

(162) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyloxy-substituted lower alkyl group, R^4 is a group of the formula:



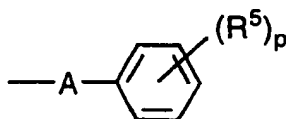
15

(in which the symbols are the same as defined above),

and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(163) A quinoxaline derivative of the formula (1) wherein R^3 is a lower alkanoyl group, R^4 is a group of the formula:

20

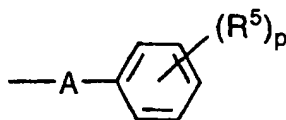


(wherein A , R^5 and p are the same as defined above),

and R^1 , R^2 and r are the same as defined above, or a salt thereof.

(164) A quinoxaline derivative of the formula (1) wherein R^3 is a lower alkoxycarbonyl group, R^4 is a group of the formula:

25



(wherein A , R^5 and p are the same as defined above),

30

and R^1 , R^2 and r are the same as defined above, or a salt thereof.

(165) A quinoxaline derivative of the formula (1) wherein R^3 is a lower alkanoyl group, R^4 is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a

- 70 -

halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(166) A quinoxaline derivative of the formula (1) wherein R³ is a lower alkoxycarbonyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula:

-O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(167) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl group, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(168) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxycarbonyl group, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(169) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl group, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(170) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxycarbonyl group, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(171) A quinoxaline derivative of the formula (1), wherein R³ is a lower

- 71 -

alkanoyl group, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(172) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy carbonyl group, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(173) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(174) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy carbonyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(175) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(176) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy carbonyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(177) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(178) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy carbonyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(179) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl group, R⁴ is a phenoxy-substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

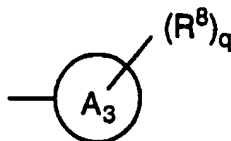
(180) A quinoxaline derivative of the formula (1), wherein R³ is a lower

- 72 -

alkoxycarbonyl group, R^4 is a phenoxy-substituted lower alkyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(181) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl group, R^4 is a group of the formula:

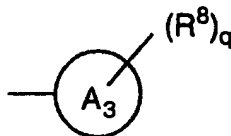
5



(wherein the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

10

(182) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy carbonyl group, R^4 is a group of the formula:



15

(in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(183) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

20

(184) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy carbonyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

25

(185) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

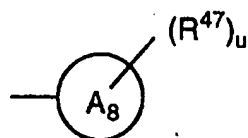
30

(186) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy carbonyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group,

- 73 -

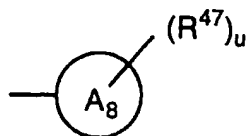
hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3 - dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

- (187) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl group, R^4 is a group of the formula:



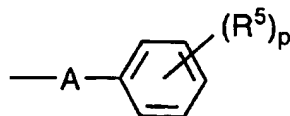
- (in which the symbols are the same as defined above),
and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

- (188) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxycarbonyl group, R^4 is a group of the formula:



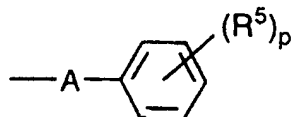
- (in which the symbols are the same as defined above),
and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

- (189) A quinoxaline derivative of the formula (1) wherein R^3 is a lower alkoxy-lower alkyl group, R^4 is a group of the formula:



- (wherein A , R^5 and p are the same as defined above),
and R^1 , R^2 and r are the same as defined above, or a salt thereof.

- (190) A quinoxaline derivative of the formula (1) wherein R^3 is phenoxycarbonyl group, R^4 is a group of the formula:



- (wherein A , R^5 and p are the same as defined above),
and R^1 , R^2 and r are the same as defined above, or a salt thereof.

- (191) A quinoxaline derivative of the formula (1) wherein R^3 is a lower alkoxy-lower alkyl group, R^4 is a phenyl-lower alkenyl group which may

- 74 -

optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula:

-O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(192) A quinoxaline derivative of the formula (1) wherein R³ is phenoxycarbonyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula:

-O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(193) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-lower alkyl group, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(194) A quinoxaline derivative of the formula (1), wherein R³ is phenoxy-carbonyl group, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(195) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above.

(196) A quinoxaline derivative of the formula (1), wherein R³ is phenoxycarbonyl group, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n

- 75 -

and r are the same as defined above, or a salt thereof.

(197) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

5 (198) A quinoxaline derivative of the formula (1), wherein R³ is phenoxycarbonyl group, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

10 (199) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

15 (200) A quinoxaline derivative of the formula (1), wherein R³ is phenoxycarbonyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(201) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy - lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

20 (202) A quinoxaline derivative of the formula (1), wherein R³ is phenoxycarbonyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

25 (203) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

30 (204) A quinoxaline derivative of the formula (1), wherein R³ is phenoxycarbonyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

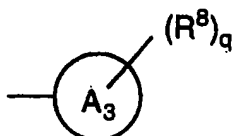
(205) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and

- 76 -

R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

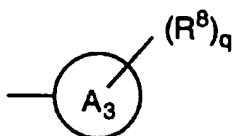
(206) A quinoxaline derivative of the formula (1), wherein R^3 is phoxycarbonyl group, R^4 is a phoxo-substituted lower alkyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

5 (207) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-lower alkyl group, R^4 is a group of the formula:



10 (wherein the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(208) A quinoxaline derivative of the formula (1), wherein R^3 is phoxycarbonyl group, R^4 is a group of the formula:



15

(in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

20 (209) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-lower alkyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(210) A quinoxaline derivative of the formula (1), wherein R^3 is phoxycarbonyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

25 (211) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

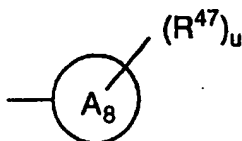
30

(212) A quinoxaline derivative of the formula (1), wherein R^3 is phoxo-

- 77 -

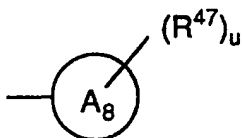
carbonyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3 - dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(213) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-lower alkyl group, R^4 is a group of the formula:



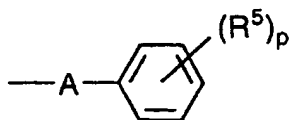
(in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(214) A quinoxaline derivative of the formula (1), wherein R^3 is phenoxy - carbonyl group, R^4 is a group of the formula:



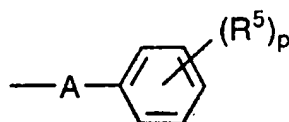
(in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(215) A quinoxaline derivative of the formula (1) wherein R^3 is a lower alkanoyl-substituted lower alkyl group, R^4 is a group of the formula:



(wherein A , R^5 and p are the same as defined above), and R^1 , R^2 and r are the same as defined above, or a salt thereof.

(216) A quinoxaline derivative of the formula (1) wherein R^3 is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R^4 is a group of the formula:



(wherein A , R^5 and p are the same as defined above), and R^1 , R^2 and r are the same as defined above, or a salt thereof.

- 78 -

(217) A quinoxaline derivative of the formula (1) wherein R³ is lower alkanoyl-substituted lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl - carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(218) A quinoxaline derivative of the formula (1) wherein R³ is a lower alkoxycarbonyloxy-substituted lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl - carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

(219) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl-substituted lower alkyl group, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(220) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxycarbonyloxy-substituted lower alkyl group, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(221) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl-substituted lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as the same, or a salt thereof.

(222) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxycarbonyloxy-substituted lower alkyl group, R⁴ is a cycloalkyl-lower alkyl

- 79 -

group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(223) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl-substituted lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

5 (224) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

10 (225) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl-substituted lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

15 (226) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

20 (227) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl-substituted lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

25 (228) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

30 (229) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkanoyl-substituted lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(230) A quinoxaline derivative of the formula (1), wherein R³ is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy

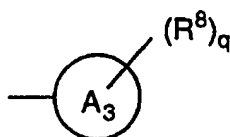
- 80 -

substituent on the phenyl moiety, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(231) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl-substituted lower alkyl group, R^4 is a phenoxy-substituted lower alkyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

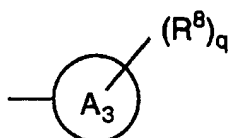
(232) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R^4 is a phenoxy-substituted lower alkyl group, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(233) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl-substituted lower alkyl group, R^4 is a group of the formula:



(wherein the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(234) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R^4 is a group of the formula:



(in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(235) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl-substituted lower alkyl group, R^4 is a group of the formula:

$-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(236) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R^4 is a group of the formula:

$-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

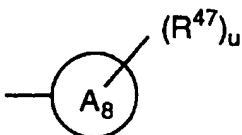
(237) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl-substituted lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-

- 81 -

substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

- 5 (238) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

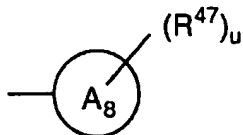
10 (239) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkanoyl-substituted lower alkyl group, R^4 is a group of the formula:



(in which the symbols are the same as defined above),

and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

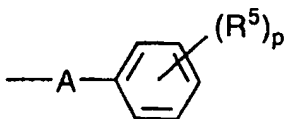
(240) A quinoxaline derivative of the formula (1), wherein R^3 is a lower alkoxy-carbonyloxy-substituted lower alkyl group, R^4 is a group of the formula:



(in which the symbols are the same as defined above),

and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

- 25 (241) A quinoxaline derivative of the formula (1) wherein R^3 is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R^4 is a group of the formula:



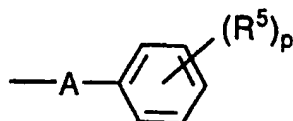
(wherein A , R^5 and p are the same as defined above),

and R^1 , R^2 and r are the same as defined above, or a salt thereof.

(242) A quinoxaline derivative of the formula (1) wherein R^3 is a group

- 82 -

of the formula: $-E-NR^{52}R^{53}$ (in which E, R^{52} and R^{53} are the same as defined above), R^4 is a group of the formula:



5

(wherein A, R^5 and p are the same as defined above),

and R^1 , R^2 and r are the same as defined above, or a salt thereof.

(243) A quinoxaline derivative of the formula (1) wherein R^3 is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R^4 is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R^1 , R^3 , R^4 , m, n and r are the same as defined above, or a salt thereof.

(244) A quinoxaline derivative of the formula (1) wherein R^3 is a group of the formula: $-E-NR^{52}R^{53}$ (in which E, R^{52} and R^{53} are the same as defined above), R^4 is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R^1 , R^3 , R^4 , m, n and r are the same as defined above, or a salt thereof.

(245) A quinoxaline derivative of the formula (1), wherein R^3 is a benzoyl-substituted lower alkyl group which may optionally have a halogen

- 83 -

substituent on the phenyl ring, R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

5 (246) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula: -E-NR⁵²R⁵³ (in which E, R⁵² and R⁵³ are the same as defined above), R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

10 (247) A quinoxaline derivative of the formula (1), wherein R³ is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(248) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula: -E-NR⁵²R⁵³ (in which E, R⁵² and R⁵³ are the same as defined above), R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

15 (249) A quinoxaline derivative of the formula (1), wherein R³ is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

20 (250) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula: -E-NR⁵²R⁵³ (in which E, R⁵² and R⁵³ are the same as defined above), R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

25 (251) A quinoxaline derivative of the formula (1), wherein R³ is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

30 (252) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula: -E-NR⁵²R⁵³ (in which E, R⁵² and R⁵³ are the same as defined above), R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(253) A quinoxaline derivative of the formula (1), wherein R³ is a

benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

5 (254) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula: -E-NR⁵²R⁵³ (in which E, R⁵² and R⁵³ are the same as defined above), R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

10 (255) A quinoxaline derivative of the formula (1), wherein R³ is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl ring, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

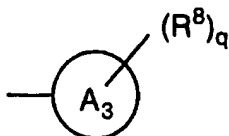
15 (256) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula: -E-NR⁵²R⁵³ (in which E, R⁵² and R⁵³ are the same as defined above), R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

20 (257) A quinoxaline derivative of the formula (1), wherein R³ is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R⁴ is a phenoxy-substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

25 (258) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula: -E-NR⁵²R⁵³ (in which E, R⁵² and R⁵³ are the same as defined above), R⁴ is a phenoxy-substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

30 (259) A quinoxaline derivative of the formula (1), wherein R³ is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring R⁴ is a group of the formula:

- 85 -



5 (wherein the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(260) A quinoxaline derivative of the formula (1), wherein R^3 is a group of the formula: $-E-NR^{52}R^{53}$ (in which E , R^{52} and R^{53} are the same as defined above), R^4 is a group of the formula:



(in which the symbols are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(261) A quinoxaline derivative of the formula (1), wherein R^3 is a
15 benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(262) A quinoxaline derivative of the formula (1), wherein R^3 is a group
20 of the formula: $-E-NR^{52}R^{53}$ (in which E , R^{52} and R^{53} are the same as defined above), R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

(263) A quinoxaline derivative of the formula (1), wherein R^3 is a
25 benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined
30 above, or a salt thereof.

(264) A quinoxaline derivative of the formula (1), wherein R^3 is a group of the formula: $-E-NR^{52}R^{53}$ (in which E , R^{52} and R^{53} are the same as defined above), R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group

- 86 -

which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro - 1H-indenyl ring, and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

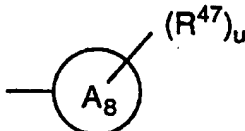
- 5 (265) A quinoxaline derivative of the formula (1), wherein R^3 is a benzoyl-substituted lower alkyl group which may optionally have a halogen substituent on the phenyl ring, R^4 is a group of the formula:



(in which the symbols are the same as defined above),

and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

- (266) A quinoxaline derivative of the formula (1), wherein R^3 is a group of the formula: $-E-NR^{52}N^{53}$ (in which E , R^{52} and R^{53} are the same as defined above), R^4 is a group of the formula:
- 15



(in which the symbols are the same as defined above),

- 20 and R^1 , R^2 , m , n and r are the same as defined above, or a salt thereof.

- (267) A quinoxaline derivative of the formula (1) wherein R^3 is a group of the formula:



(in which A and R^{54} are the same as defined above), R^4 is a group of the formula:



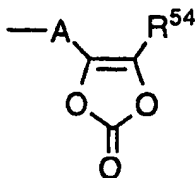
(in which A , R^5 and p are the same as defined above),

and R^1 , R^2 and r are the same as defined above, or a salt thereof.

- 87 -

(268) A quinoxaline derivative of the formula (1) wherein R³ is a group of the formula:

5

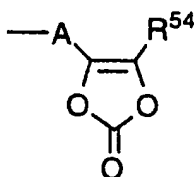


(in which A and R⁵⁴ are the same as defined above), R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl - lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and R¹, R³, R⁴, m, n and r are the same as defined above, or a salt thereof.

15

(269) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:

20

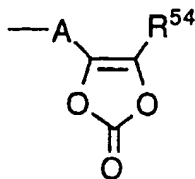


(in which A and R⁵⁴ are the same as defined above), R⁴ is a lower alkenyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

25

(270) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:

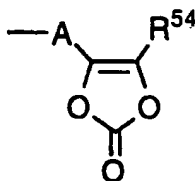
30



(in which A and R⁵⁴ are the same as defined above), R⁴ is a cycloalkyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

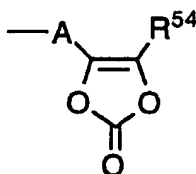
- 88 -

(271) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:



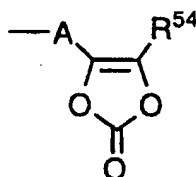
(in which A and R⁵⁴ are the same as defined above), R⁴ is a naphthyl-lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

(272) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:



(in which A and R⁵⁴ are the same as defined above), R⁴ is a phenylthio - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

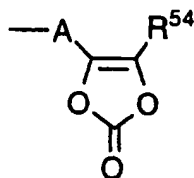
(273) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:



(in which A and R⁵⁴ are the same as defined above), R⁴ is a phenylsulfinyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

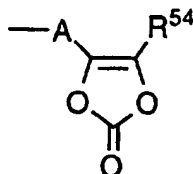
(274) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:

- 89 -



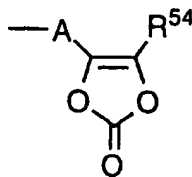
- 5 (in which A and R⁵⁴ are the same as defined above), R⁴ is a phenylsulfonyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

10 (275) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:

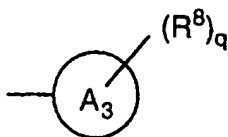


- 15 (in which A and R⁵⁴ are the same as defined above), R⁴ is a phenoxy - substituted lower alkyl group, and R¹, R², m, n and r are the same as defined above, or a salt thereof.

20 (276) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:



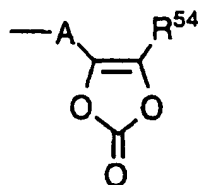
25 (in which A and R⁵⁴ are the same as defined above), R⁴ is a group of the formula:



- 30 (wherein the symbols are the same as defined above), and R¹, R², m, n and r are the same as defined above, or a salt thereof.

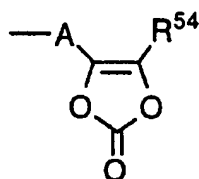
(277) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:

- 90 -



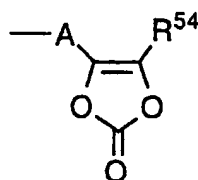
- 5 (in which A and R⁵⁴ are the same as defined above), R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and R¹, R², m, n and r are the same as defined above, or a salt thereof.
(278) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:

10

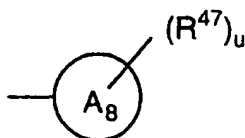


- 15 (in which A and R⁵⁴ are the same as defined above), R⁴ is a 2,3-dihydro-1H - indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R¹, R², m, n and r are the same as defined above, or a salt thereof.
(279) A quinoxaline derivative of the formula (1), wherein R³ is a group of the formula:

20



- 25 (in which A and R⁵⁴ are the same as defined above), R⁴ is a group of the formula:

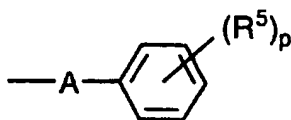


- 30 (in which the symbols are the same as defined above), and R¹, R², m, n and r are the same as defined above, or a salt thereof.
(280) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an

- 91 -

aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

5



(in which A, R⁵ and p are the same as defined above),

and m, n and r are the same as defined above, or a salt thereof.

(281) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenyl - lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

(282) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

(283) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a cycloalkyl - lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(284) A quinoxaline derivative of the formula (1), wherein R¹ is a lower

- 92 -

alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl - lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(285) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl - lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(286) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylthio - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(287) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

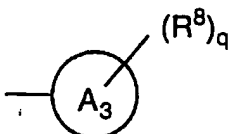
(288) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(289) A quinoxaline derivative of the formula (1), wherein R¹ is a lower

- 93 -

alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy - substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(290) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

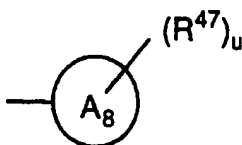
(291) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(292) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a 2,3-dihydro - 1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

(293) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is hydrogen atom, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the

- 94 -

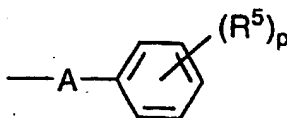
formula:



5 (in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(294) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is
 10 hydrogen atom, R^3 and R^4 combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.

(295) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an
 15 aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a lower alkyl group having optionally a halogen substituent, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:



20 (in which A, R^5 and p are the same as defined above),
 and m, n and r are the same as defined above, or a salt thereof.

(296) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an
 25 aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a lower alkyl group having optionally a halogen substituent, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a
 30 lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined

- 95 -

above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

5 (297) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

10 (298) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

15 (299) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

20 (300) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

25 (301) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which

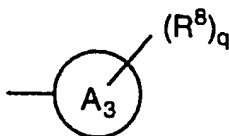
- 96 -

may optionally have a lower alkoxy substituent on the phenyl moiety and m, n and r are the same as defined above, or a salt thereof.

(302) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(303) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(304) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

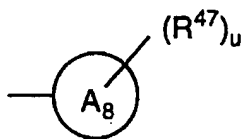
(305) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a lower alkyl group having optionally a halogen substituent, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(306) A quinoxaline derivative of the formula (1), wherein R¹ is a lower

- 97 -

alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a lower alkyl group having optionally a halogen substituent, R^3 is hydrogen atom or a lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

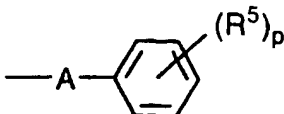
(307) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a lower alkyl group having optionally a halogen substituent, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:



(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(308) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a lower alkyl group having optionally a halogen substituent, R^3 and R^4 combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group, and m, n and r are the same as defined above, or a salt thereof.

(309) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:



(in which A, R^5 and p are the same as defined above),

- 98 -

and m, n and r are the same as defined above, or a salt thereof.

5 (310) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl - carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

15 (311) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

20 (312) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a cycloalkyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

25 (313) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

30 (314) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylthio-

- 99 -

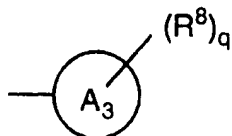
substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(315) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfinyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety and m, n and r are the same as defined above, or a salt thereof.

(316) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl - substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(317) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(318) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is phenyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

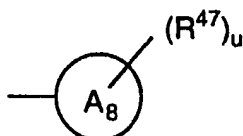
(319) A quinoxaline derivative of the formula (1), wherein R¹ is a lower

- 100 -

alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(320) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

(321) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is phenyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:

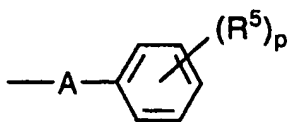


(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(322) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is phenyl group, R^3 and R^4 combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.

(323) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a group of the formula:

- 101 -



(in which A, R^5 and p are the same as defined above),

5 and m, n and r are the same as defined above, or a salt thereof.

(324) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

20 (325) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a lower alkenyl group, and m, n and r are the same as defined above, or a salt thereof.

25 (326) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R^2 is a morpholino-substituted lower alkyl group, R^3 is hydrogen atom or a lower alkyl group, R^4 is a cycloalkyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

30 (327) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an

- 102 -

aminocarbonyl group having optionally a lower alkyl substituent, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

5 (328) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally
10 have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(329) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a
15 morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety and m, n and r are the same as defined above, or a salt thereof.

(330) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a
20 morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r
25 are the same as defined above, or a salt thereof.

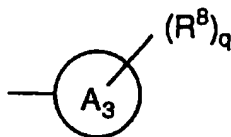
(331) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a
30 morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(332) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an

- 103 -

aminocarbonyl group having optionally a lower alkyl substituent, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

5



(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

10

(333) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

15

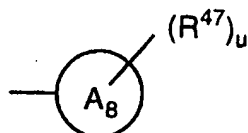
20

(334) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

25

(335) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a morpholino-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

30



(in which the symbols are the same as defined above), and m, n and r are the

- 104 -

same as defined above, or a salt thereof.

(336) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is a morpholino-substituted lower alkyl group, R³ and R⁴ combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.

(337) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which A, R⁵ and p are the same as defined above),

and m, n and r are the same as defined above, or a salt thereof.

(338) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, and m, n and r are the same as defined above, or a salt thereof.

(339) A quinoxaline derivative of the formula (1), wherein R¹ is a lower

alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a lower alkenyl group, and m, n and r are the same as defined
5 above, or a salt thereof.

(340) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl
10 group, R⁴ is a cycloalkyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(341) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl
15 group, R⁴ is a naphthyl-lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(342) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl
20 group, R⁴ is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(343) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl
25 group, R⁴ is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety and m, n and r are the same as defined above, or a salt thereof.
30

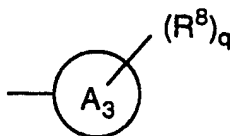
(344) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an

- 106 -

aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and m, n and r are the same as defined above, or a salt thereof.

(345) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a phenoxy-substituted lower alkyl group, and m, n and r are the same as defined above, or a salt thereof.

(346) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:



(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

(347) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (A₅, R⁴², R⁴³ and R⁴⁴ are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

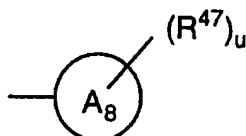
(348) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a 2,3-dihydro-1H-indenyl group-substituted lower alkyl group

- 107 -

which may optionally have a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n and r are the same as defined above, or a salt thereof.

- 5 (349) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ is hydrogen atom or a lower alkyl group, R⁴ is a group of the formula:

10

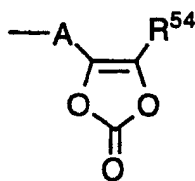


(in which the symbols are the same as defined above), and m, n and r are the same as defined above, or a salt thereof.

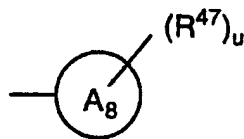
- 15 (350) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent or an aminocarbonyl group having optionally a lower alkyl substituent, R² is an imidazolyl-substituted lower alkyl group, R³ and R⁴ combine together with the nitrogen atom to form 1,2,3,4-tetrahydroisoquinolyl group which may optionally
20 have a lower alkoxy group), and m, n and r are the same as defined above, or a salt thereof.


- 108 -

(351) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



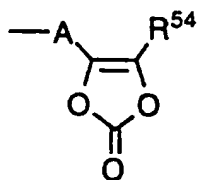
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:



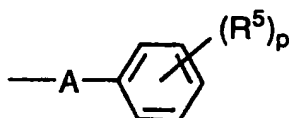
(in which the group , R⁴⁷ and u are as defined above), and R², m, n, and r are as defined above, or a salt thereof.

(352) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

- 109 -

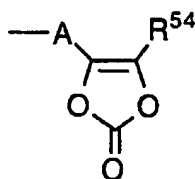


- 5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



- 10 (in which A, R^5 and p are as defined above), and R^2 , m, n, and r are as defined above, or a salt thereof.

- (353) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R^{52})(R^{53}) (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:
- 20

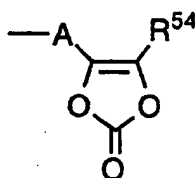


- 25 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl-carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the
- 30

- 110 -

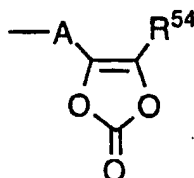
phenyl moiety, and R^2 , m , n , and r are as defined above, or a salt thereof.

(354) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group; and R^2 , m , n , and r are as defined above, or a salt thereof.

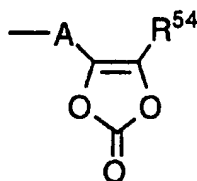
(355) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group; and R^2 , m , n , and r are as defined above, or a salt thereof.

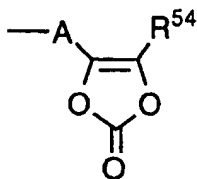
- 111 -

(356) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a naphthyl-lower alkyl group; and R², m, n, and r are as defined above, or a salt thereof.

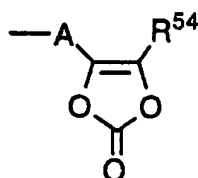
(357) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; and R², m, n, and r are as defined above, or a salt thereof.

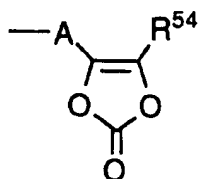
- 112 -

(358) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; and R², m, n, and r are as defined above, or a salt thereof.

(359) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

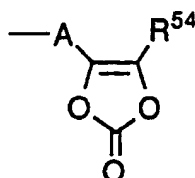


(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; and R², m, n, and r

- 113 -

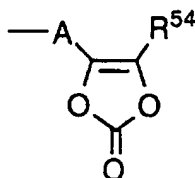
are as defined above, or a salt thereof.

(360) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



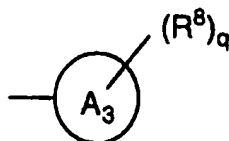
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenoxy-substituted lower alkyl group; and R², m, n, and r are as defined above, or a salt thereof.


(361) A quinoxaline derivative of the formula (1), wherein R¹ is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:

- 114 -

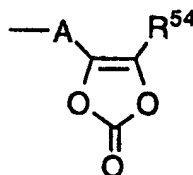


(in which the group , R^8 and q are as defined above); and R^2 , m , n ,

5 and r are as defined above, or a salt thereof.

(362) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:

15

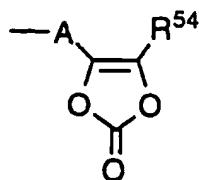


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are as defined above); and R^2 , m , n , and r are as defined above, or a salt thereof.

(363) A quinoxaline derivative of the formula (1), wherein R^1 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:

30

- 115 -




5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and R^2 , m, n, and r are as defined above, or a salt thereof.

10 (364) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



(in which the group , R^{47} and u are as defined above), and m, n, and r are as defined above, or a salt thereof.

30 (365) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is hydrogen atom; R^3 is a lower

- 116 -

alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



(in which A, R^5 and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(366) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

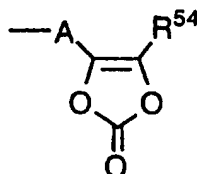


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenyl-lower alkenyl group having optionally a

- 117 -

substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m , n , and r are as defined above, or a salt thereof.

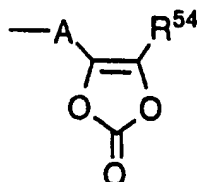
(367) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m , n , and r are as defined above, or a salt thereof.

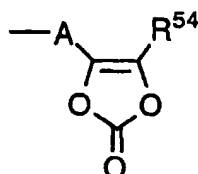
(368) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:

- 118 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(369) A quinoxaline derivative of the formula (1), wherein R^1 is a
 10 halogen atom or a lower alkyl group; R^2 is hydrogen atom; R^3 is a lower
 alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a
 lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower
 alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl
 group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl
 15 group, a benzoyl-substituted lower alkyl group having optionally a halogen
 substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which
 E, R^{52} and R^{53} are as defined above), or a group of the formula:

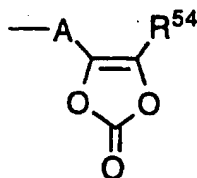


20

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

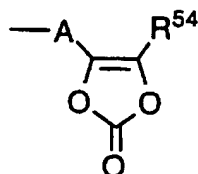
(370) A quinoxaline derivative of the formula (1), wherein R^1 is a
 25 halogen atom or a lower alkyl group; R^2 is hydrogen atom; R^3 is a lower
 alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a
 lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower
 alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl
 group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl
 30 group, a benzoyl-substituted lower alkyl group having optionally a halogen
 substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which
 E, R^{52} and R^{53} are as defined above), or a group of the formula:

- 119 -



5 (in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(371) A quinoxaline derivative of the formula (1), wherein R¹ is a
 10 halogen atom or a lower alkyl group; R² is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl
 15 group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



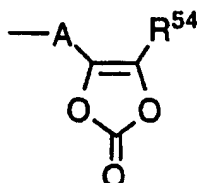
20

(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are
 25 as defined above, or a salt thereof.

(372) A quinoxaline derivative of the formula (1), wherein R¹ is a
 halogen atom or a lower alkyl group; R² is hydrogen atom; R³ is a lower
 alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a
 lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower
 30 alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which

- 120 -

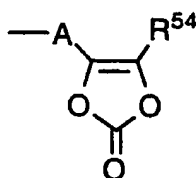
E, R⁵² and R⁵³ are as defined above), or a group of the formula:



5

(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

10 (373) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl
15 group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



20

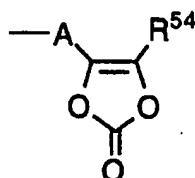
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

25

(374) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy -
30 carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and

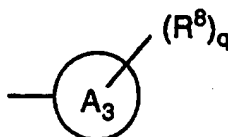
- 121 -

R⁵³ are as defined above), or a group of the formula:

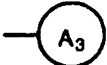


5

(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:



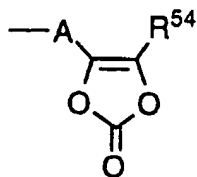
10

(in which the group , R⁸ and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

(375) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

15

20



25

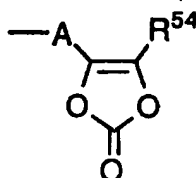
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅, R⁴², R⁴³ and R⁴⁴ are as defined above), and m, n, and r are as defined above, or a salt thereof.

30

(376) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is hydrogen atom; R³ is a lower

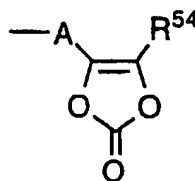
- 122 -

alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



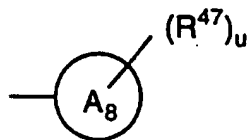
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n, and r are as defined above, or a salt thereof.

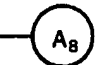
(377) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



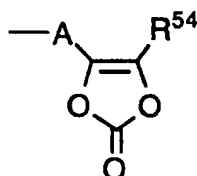
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

- 123 -

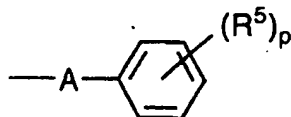


(in which the group , R^{47} and u are as defined above), and m , n , and r are as defined above, or a salt thereof.

(378) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

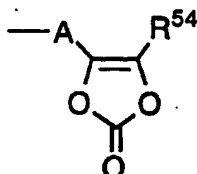


(in which A , R^5 and p are as defined above), and m , n , and r are as defined above, or a salt thereof.

(379) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a

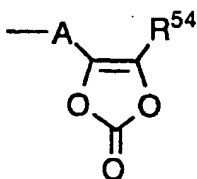
- 124 -

lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(380) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E - N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

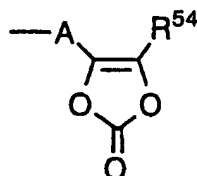


- 125 -

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

- (381) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

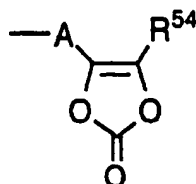
15



- (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

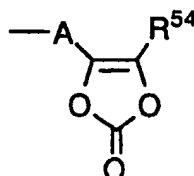
- (382) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

- 126 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(383) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a lower alkyl group having optionally
 10 a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having
 15 optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



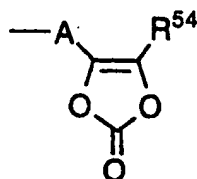
20

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are
 25 as defined above, or a salt thereof.

(384) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a lower alkyl group having optionally
 a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower
 30 alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula:

- 127 -

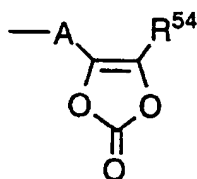
-E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(385) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula:

-E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



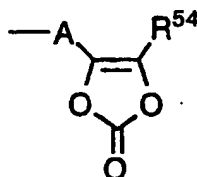
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(381) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a

- 128 -

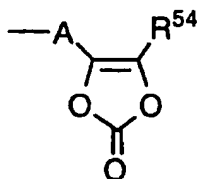
lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula:

-E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

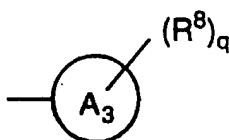


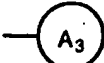
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(387) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:

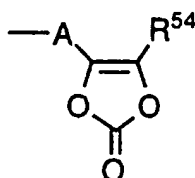


(in which the group , R⁸ and q are as defined above), and m, n, and r

- 129 -

are as defined above, or a salt thereof.

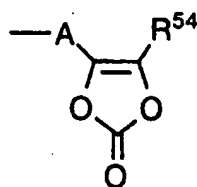
(388) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅, R⁴², R⁴³ and R⁴⁴ are as defined above), and m, n, and r are as defined above, or a salt thereof.

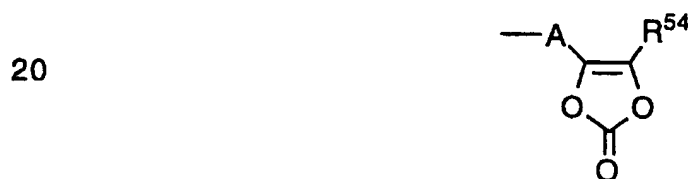
(389) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

- 130 -




5 (In which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n, and r are as defined above, or a salt thereof.

10 (390) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



(in which the group , R^{47} and u are as defined above), and m, n, and r are as defined above, or a salt thereof.

30 (391) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is phenyl group; R^3 is a lower

- 131 -

alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



(in which A, R^5 and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(392) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenyl-lower alkenyl group having optionally a

- 132 -

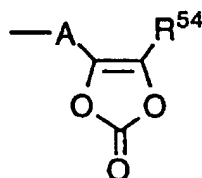
substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the

5 tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(393) A quinoxaline derivative of the formula (1), wherein R^1 is a

10 halogen atom or a lower alkyl group; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl

15 group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



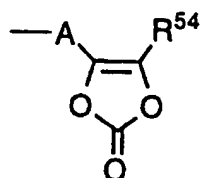
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

(394) A quinoxaline derivative of the formula (1), wherein R^1 is a

25 halogen atom or a lower alkyl group; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl

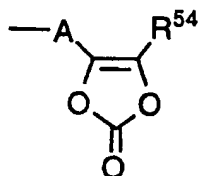
30 group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

- 133 -



5 (in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

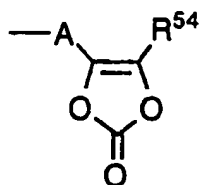
(395) A quinoxaline derivative of the formula (1), wherein R¹ is a
 10 halogen atom or a lower alkyl group; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen
 15 substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



20 (in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

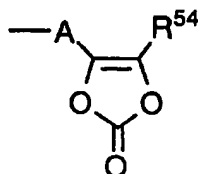
(396) A quinoxaline derivative of the formula (1), wherein R¹ is a
 25 halogen atom or a lower alkyl group; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen
 30 substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

- 134 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(397) A quinoxaline derivative of the formula (1), wherein R^1 is a
 10 halogen atom or a lower alkyl group; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl
 15 group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



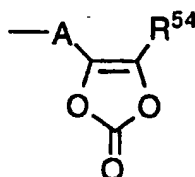
20

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are
 25 as defined above, or a salt thereof.

(398) A quinoxaline derivative of the formula (1), wherein R^1 is a
 halogen atom or a lower alkyl group; R^2 is phenyl group; R^3 is a lower
 alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a
 lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower
 30 alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which

- 135 -

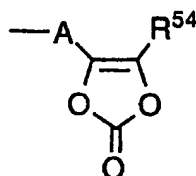
E, R⁵² and R⁵³ are as defined above), or a group of the formula:



5

(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

10 (399) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl
15 group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



20

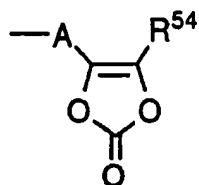
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

25

(400) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl
30 group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which

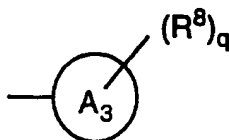
- 136 -

E, R⁵² and R⁵³ are as defined above), or a group of the formula:

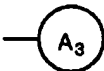


5

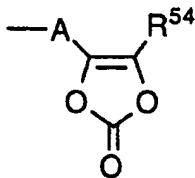
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:



10

(in which the group , R⁸ and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

(401) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



25

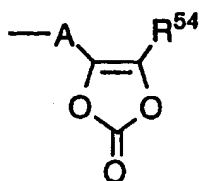
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅, R⁴², R⁴³ and R⁴⁴ are as defined above), and m, n, and r are as defined above, or a salt thereof.

(402) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is phenyl group; R³ is a lower

30

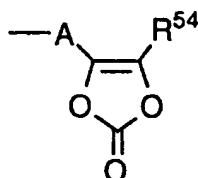
- 137 -

alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



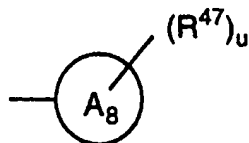
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n, and r are as defined above, or a salt thereof.

(403) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

- 138 -

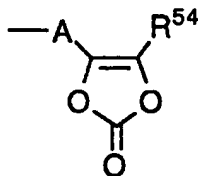


(in which the group $\text{---} \bigcirc A_8$, R^{47} and u are as defined above), and m , n , and r

5 are as defined above, or a salt thereof.

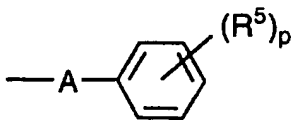
(404) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $\text{---}E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:

15



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

20



(in which A , R^5 and p are as defined above), and m , n , and r are as defined above, or a salt thereof.

25

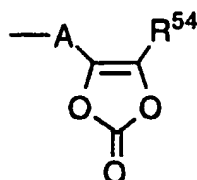
(405) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower

30

- 139 -

alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

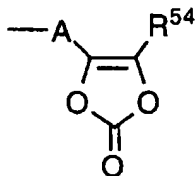
5



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(406) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

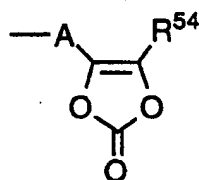
30



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

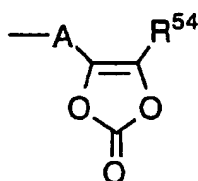
- 140 -

(407) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(408) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

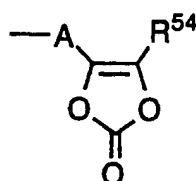


(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(409) A quinoxaline derivative of the formula (1), wherein R¹ is a

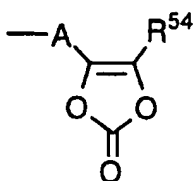
- 141 -

halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

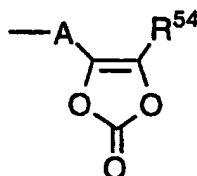
(410) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

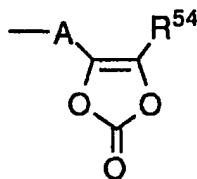
- 142 -

(411) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

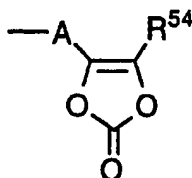
(412) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



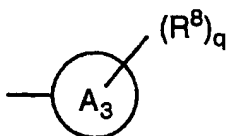
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

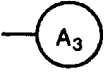
- 143 -

(413) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



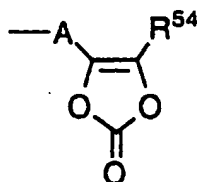
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:



(in which the group , R⁸ and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

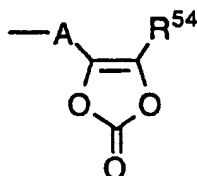
(414) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

- 144 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are as defined above), and m, n, and r are as defined above, or a salt thereof.

(415) A quinoxaline derivative of the formula (1), wherein R^1 is a
 10 halogen atom or a lower alkyl group; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower
 15 alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



20

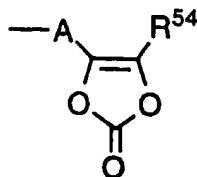
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a
 25 silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n, and r are as defined above, or a salt thereof.

(416) A quinoxaline derivative of the formula (1), wherein R^1 is a
 halogen atom or a lower alkyl group; R^2 is an imidazolyl-substituted lower alkyl
 group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower
 30 alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a

- 145 -

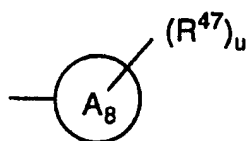
halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$
(in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

5



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

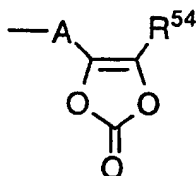
10



(in which the group $\text{---} \bigcirc \text{A}_B$, R^{47} and u are as defined above), and m, n, and r are as defined above, or a salt thereof.

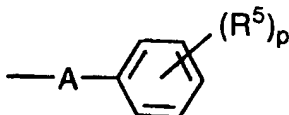
(417) A quinoxaline derivative of the formula (1), wherein R^1 is a
15 halogen atom or a lower alkyl group; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy -
20 lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$
(in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

25



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

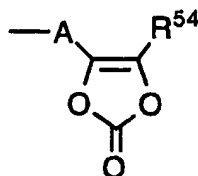
30



- 146 -

(in which A, R⁵ and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(418) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

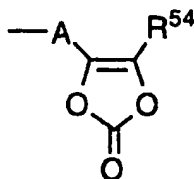


(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(419) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³)

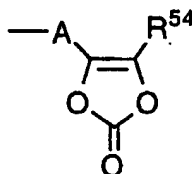
- 147 -

(in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

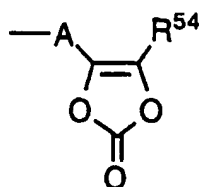
(420) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

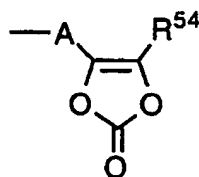
(421) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

- 148 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(422) A quinoxaline derivative of the formula (1), wherein R^1 is a
 halogen atom or a lower alkyl group; R^2 is an imidazolyl-substituted lower alkyl
 10 group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower
 alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group,
 a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy -
 lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower
 alkyl group, a benzoyl-substituted lower alkyl group having optionally a
 15 halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$
 (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

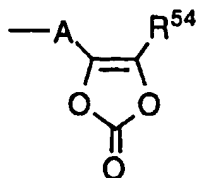


20

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

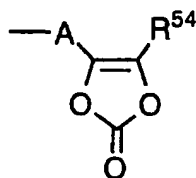
25 (423) A quinoxaline derivative of the formula (1), wherein R^1 is a
 halogen atom or a lower alkyl group; R^2 is an imidazolyl-substituted lower alkyl
 group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower
 alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group,
 a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy -
 30 lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower
 alkyl group, a benzoyl-substituted lower alkyl group having optionally a
 halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$
 (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

- 149 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(424) A quinoxaline derivative of the formula (1), wherein R^1 is a
 10 halogen atom or a lower alkyl group; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower
 15 alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



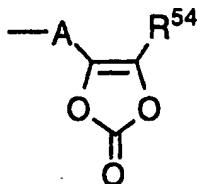
20

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are
 25 as defined above, or a salt thereof.

(425) A quinoxaline derivative of the formula (1), wherein R^1 is a
 halogen atom or a lower alkyl group; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower
 alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group,
 30 a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$

- 150 -

(in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

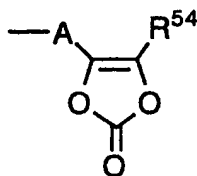


5

(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

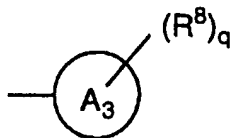
(426) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

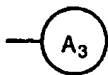
20



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:

25



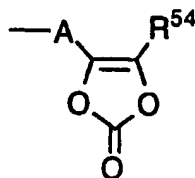
(in which the group , R⁸ and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

(427) A quinoxaline derivative of the formula (1), wherein R¹ is a halogen atom or a lower alkyl group; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-

30

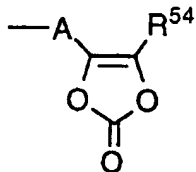
- 151 -

carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are as defined above), and m, n, and r are as defined above, or a salt thereof.

(428) A quinoxaline derivative of the formula (1), wherein R^1 is a halogen atom or a lower alkyl group; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

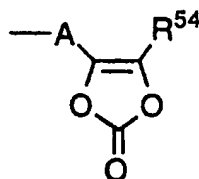


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n, and r are as defined above, or a salt thereof.

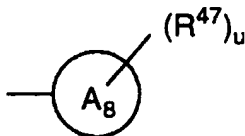
(429) A quinoxaline derivative of the formula (1), wherein R^1 is a lower

- 152 -

alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

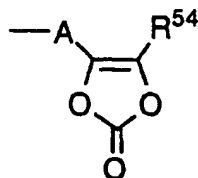


(in which the group $\text{---} \bigcirc_{A_B}$, R^{47} and u are as defined above), and m, n, and r are as defined above, or a salt thereof.

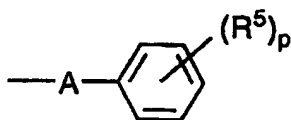
(430) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of

- 153 -

the formula:

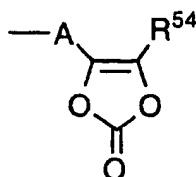


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



(in which A, R^5 and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(431) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

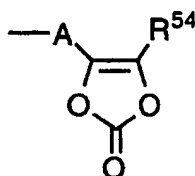


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the

- 154 -

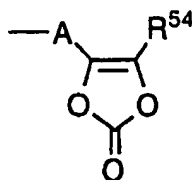
tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

- 5 (432) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl -
- 10 substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:
- 15



- 20 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.
- (433) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl -
- 25 substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:
- 30

- 155 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(434) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is
 10 hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl -
 15 substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

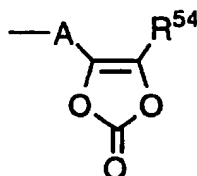


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a naphthyl-lower alkyl group, and m, n, and r are as
 25 defined above, or a salt thereof.

(435) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is
 hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a
 30 lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl -
 substituted lower alkyl group, a benzoyl-substituted lower alkyl group having

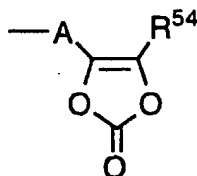
- 156 -

optionally a halogen substituent on the phenyl ring, a group of the formula:
 -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of
 the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as
 defined above); R⁴ is a phenylthio-substituted lower alkyl group having
 optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are
 as defined above, or a salt thereof.

(436) A quinoxaline derivative of the formula (1), wherein R¹ is a lower
 alkoxy group, an amino group having optionally a lower alkyl substituent, or an
 aminocarbonyl group having optionally a lower alkyl substituent; R² is
 hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a
 lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl
 group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower
 alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl -
 substituted lower alkyl group, a benzoyl-substituted lower alkyl group having
 optionally a halogen substituent on the phenyl ring, a group of the formula:
 -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of
 the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as
 defined above); R⁴ is a phenylsulfinyl-substituted lower alkyl group having
 optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are
 as defined above, or a salt thereof.

(437) A quinoxaline derivative of the formula (1), wherein R¹ is a lower
 alkoxy group, an amino group having optionally a lower alkyl substituent, or an
 aminocarbonyl group having optionally a lower alkyl substituent; R² is

- 157 -

hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl -

5 substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfonyl-substituted lower alkyl group having

15 optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(438) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is

20 hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl -

substituted lower alkyl group, a benzoyl-substituted lower alkyl group having

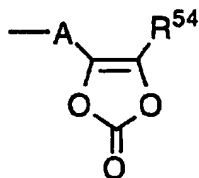
25 optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



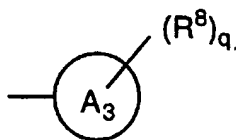
- 158 -

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(439) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



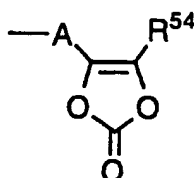
(in which the group $\text{---} \bigcirc A_3$, R^8 and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

(440) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is hydrogen atom; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower

- 159 -

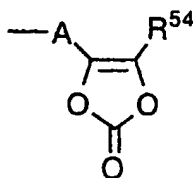
alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula:

-E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅, R⁴², R⁴³ and R⁴⁴ are as defined above), and m, n, and r are as defined above, or a salt thereof.

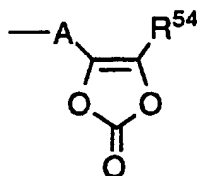
(441) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is hydrogen atom; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl - substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



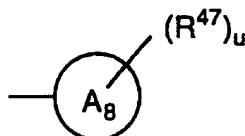
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n, and r are as defined above, or a salt thereof.

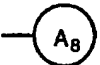
- 160 -

(442) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy -
 5 substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the
 10 phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:



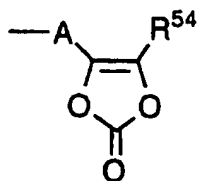
(in which the group , R⁴⁷ and u are as defined above), and m, n, and r are as defined above, or a salt thereof.

(443) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy -
 25 substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy - carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a
 30 benzoyl-substituted lower alkyl group having optionally a halogen substituent

- 161 -

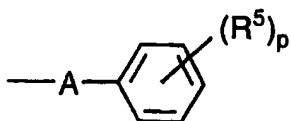
on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

5



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

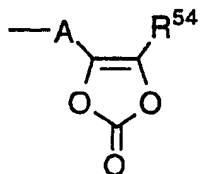
10



(in which A, R^5 and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(444) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

25



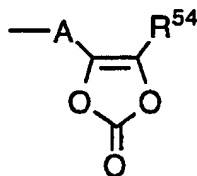
30

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl carbonyl group, a lower alkoxy-substituted lower alkoxy

- 162 -

group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(445) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

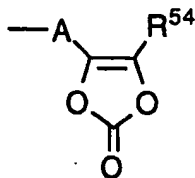


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

(446) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53}

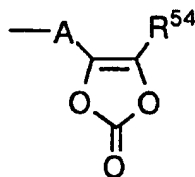
- 163 -

are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(447) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



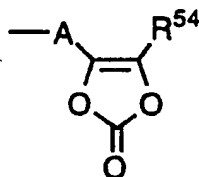
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(448) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-

- 164 -

carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

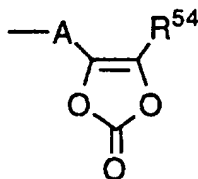
5



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(449) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

25

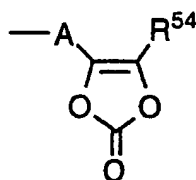


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(450) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an

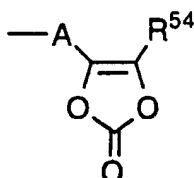
- 165 -

aminocarbonyl group having optionally a lower alkyl substituent; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(451) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a lower alkyl group having optionally a halogen substituent; R³ is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

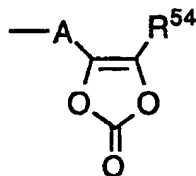


- 166 -

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

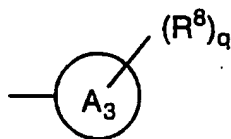
(452) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

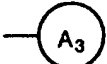
15



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

20



(in which the group , R^8 and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

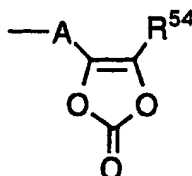
25

(453) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl

30

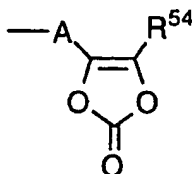
- 167 -

group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are as defined above), and m, n, and r are as defined above, or a salt thereof.

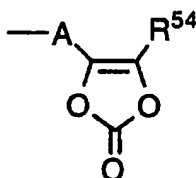
(454) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a lower alkyl group having optionally a halogen substituent; R^3 is a lower alkanoyloxy - substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxy - carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy - carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl - substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



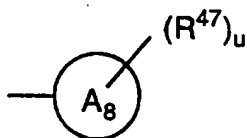
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m, n, and r are as defined above, or a salt thereof.

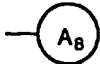
- 168 -

- (455) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy -
 5 carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³)
 10 (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



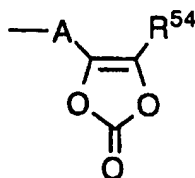
- 15 (in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a group of the formula:



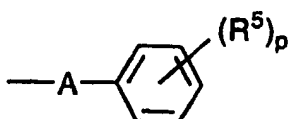
- 20 (in which the group , R⁴⁷ and u are as defined above), and m, n, and r are as defined above, or a salt thereof.

- (456) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is phenyl
 25 group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a
 30 halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

- 169 -

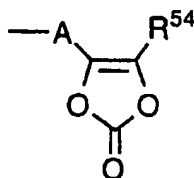


5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



10 (in which A, R^5 and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(457) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a
 20 halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



25

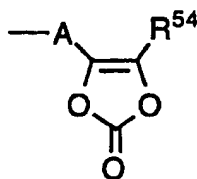
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 , R^{40} and R^{41} are as defined above), a lower alkenyloxy group, nitro

30

- 170 -

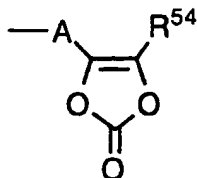
group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(458) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

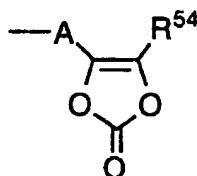
(459) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is phenyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



- 171 -

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

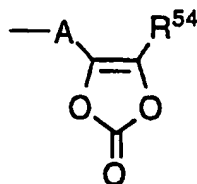
(460) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(461) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

- 172 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(462) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy -
 10 lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

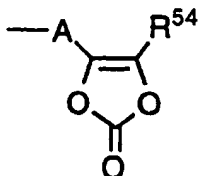


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(463) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy -
 30 lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower

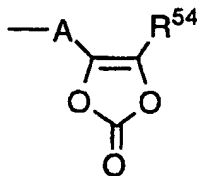
- 173 -

alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(464) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

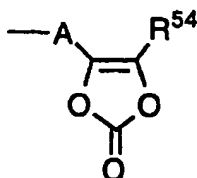


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

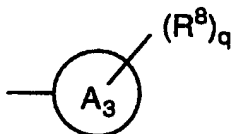
(465) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a

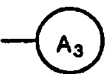
- 174 -

- phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

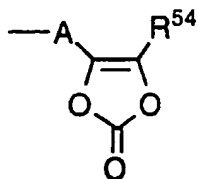


- (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



- (in which the group , R^8 and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

- (466) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy - carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy - lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

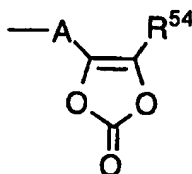


- (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as

- 175 -

defined above); R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are as defined above), and m , n , and r are as defined above, or a salt thereof.

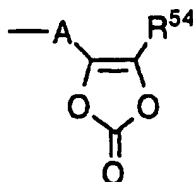
(467) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is phenyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:



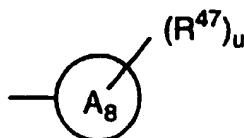
(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m , n , and r are as defined above, or a salt thereof.

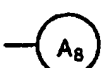
(468) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:

- 176 -

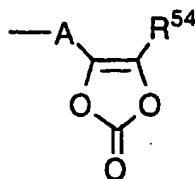


- 5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

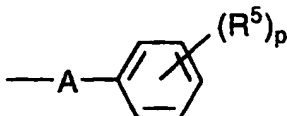


- 10 (in which the group , R^{47} and u are as defined above), and m, n, and r are as defined above, or a salt thereof.

- (469) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



- 25 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

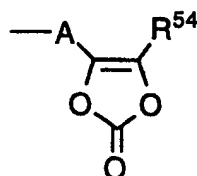


30

- 177 -

(in which A, R⁵ and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(470) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

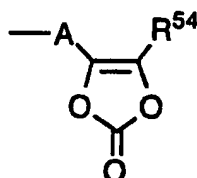


(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl-carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(471) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower

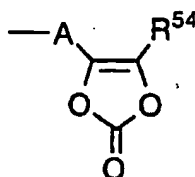
- 178 -

alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

(472) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

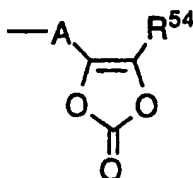


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(473) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a

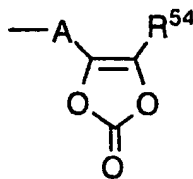
- 179 -

morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(474) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

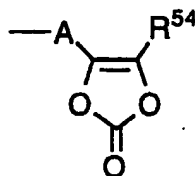


(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are

- 180 -

as defined above, or a salt thereof.

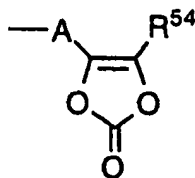
(475) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(476) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

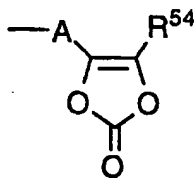
- 181 -



5 (in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(477) A quinoxaline derivative of the formula (1), wherein R¹ is a lower
 10 alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is a morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy -
 15 substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

20



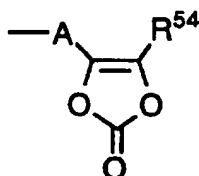
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as
 25 defined above); R⁴ is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(478) A quinoxaline derivative of the formula (1), wherein R¹ is a lower
 alkoxy group, an amino group having optionally a lower alkyl substituent, or an
 aminocarbonyl group having optionally a lower alkyl substituent; R² is a
 30 morpholino-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy -
 substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower
 alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy carbonyl group, a

- 182 -

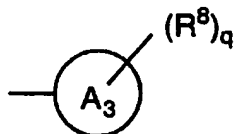
lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

5

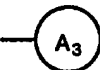


10

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



15

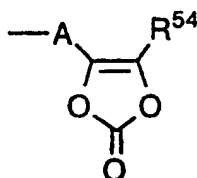
(in which the group , R^8 and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

20

25

(479) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

30

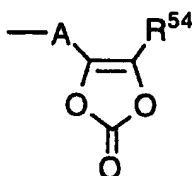


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as

- 183 -

defined above); R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are as defined above), and m , n , and r are as defined above, or a salt thereof.

(480) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is a morpholino-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:

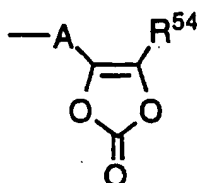


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m , n , and r are as defined above, or a salt thereof.

(481) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or

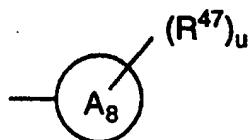
- 184 -

a group of the formula:



5

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



10

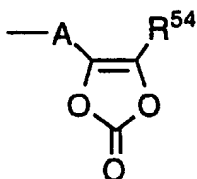
(in which the group $\text{---} \text{A}_8$, R^{47} and u are as defined above), and m , n , and r are as defined above, or a salt thereof.

(482) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $\text{---E-N(R}^{52}\text{)(R}^{53}\text{)}$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

15

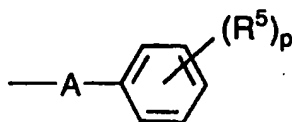
20

25



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:

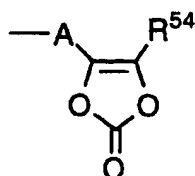
30



- 185 -

(in which A, R⁵ and p are as defined above), and m, n, and r are as defined above, or a salt thereof.

(483) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

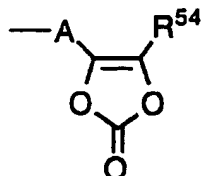


(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl carbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(484) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower

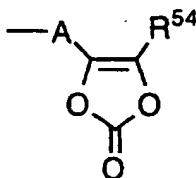
- 186 -

alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a lower alkenyl group, and m, n, and r are as defined above, or a salt thereof.

(485) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

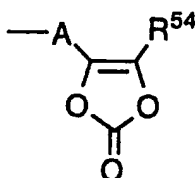


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a cycloalkyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(486) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an

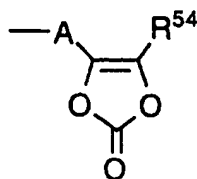
- 187 -

imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:



(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a naphthyl-lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(487) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is an imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy-carbonyl group, a lower alkoxy-carbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxy-carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

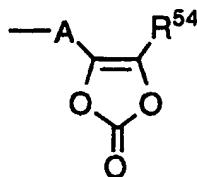


(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety, and m, n, and r are

- 188 -

as defined above, or a salt thereof.

(488) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is an
 5 imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a
 10 lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

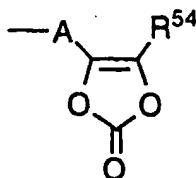


15

(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); R⁴ is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are
 20 as defined above, or a salt thereof.

(489) A quinoxaline derivative of the formula (1), wherein R¹ is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R² is an
 25 imidazolyl-substituted lower alkyl group; R³ is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl
 30 group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which E, R⁵² and R⁵³ are as defined above), or a group of the formula:

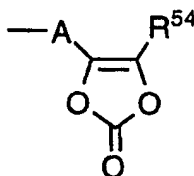
- 189 -



5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, and m, n, and r are as defined above, or a salt thereof.

(490) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

20



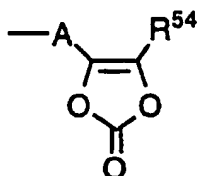
25 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a phenoxy-substituted lower alkyl group, and m, n, and r are as defined above, or a salt thereof.

(491) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy - substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a

- 190 -

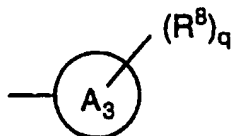
lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

5

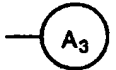


10

(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a group of the formula:



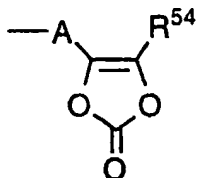
15

(in which the group , R^8 and q are as defined above), and m, n, and r are as defined above, or a salt thereof.

20

(492) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, a lower alkoxy carbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E, R^{52} and R^{53} are as defined above), or a group of the formula:

30

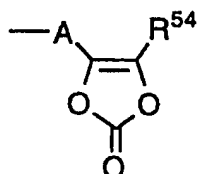


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as

- 191 -

defined above); R^4 is a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are as defined above), and m , n , and r are as defined above, or a salt thereof.

(493) A quinoxaline derivative of the formula (1), wherein R^1 is a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent; R^2 is an imidazolyl-substituted lower alkyl group; R^3 is a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a phenyl-lower alkoxycarbonyl group, a lower alkanoyl group, a lower alkoxy-lower alkyl group, a phenoxycarbonyl group, a lower alkanoyl-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: $-E-N(R^{52})(R^{53})$ (in which E , R^{52} and R^{53} are as defined above), or a group of the formula:

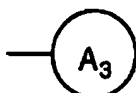


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); R^4 is a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, and m , n , and r are as defined above, or a salt thereof.

- 192 -

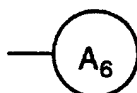
The compound of the present invention also includes the compounds of the formula (1) wherein both m and n are simultaneously 1, or m is 1 and n is 0, or m is 0 and n is 1, or both m and n are simultaneously 0, but the more preferable compounds are compounds of the formula (1) wherein m is 1 and n is 0.

The heterocyclic group represented by the formula:



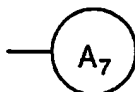
includes, for example, pyridyl, thiazolyl, furyl, benzimidazolyl, benzothiazolyl, oxazolyl, quinolyl, indolyl, 1,4-benzodioxanyl, 3,4-dihydrofuro[2,3-g]quinolyl, 1,2,3,4-tetrahydrofuro[2,3-g]quinolyl, furo[3,2-c]pyridyl, furo[2,3-g]quinolyl, benzofuryl, benzothienyl, 2,3-dihydrobenzofuryl, perhydrobenzofuryl, imidazolyl, 1,2,3,4-tetrazolyl, imidazo[1,2-a]pyridyl, and the like.

The heterocyclic group represented by the formula:



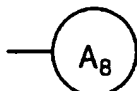
includes, for example, 1,2,3,4-tetrazolyl, thiazolyl, pyridyl, oxazolyl, 1,2,3,5-oxathiadiazolyl, 1,3,4-triazolyl, 1,2,4-oxadiazolyl, 1,2,4-triazinyl, imidazolyl, 1,3,4-oxadiazolyl, pyrimidinyl, 1,2,3,4-tetrazolyl, 3,4-dihydrofuro[2,3-g]quinolyl, 1,2,3,4-tetrahydrofuro[2,3-g]quinolyl, naphtho[2,1-b]furyl, oxazolyl, furo[2,3-g]quinolyl, and the like.

The heterocyclic group represented by the formula:



includes, for example, thiazolyl, 1,2,3,4-tetrazolyl, thiazolidinyl, and the like.

The heterocyclic group represented by the formula:

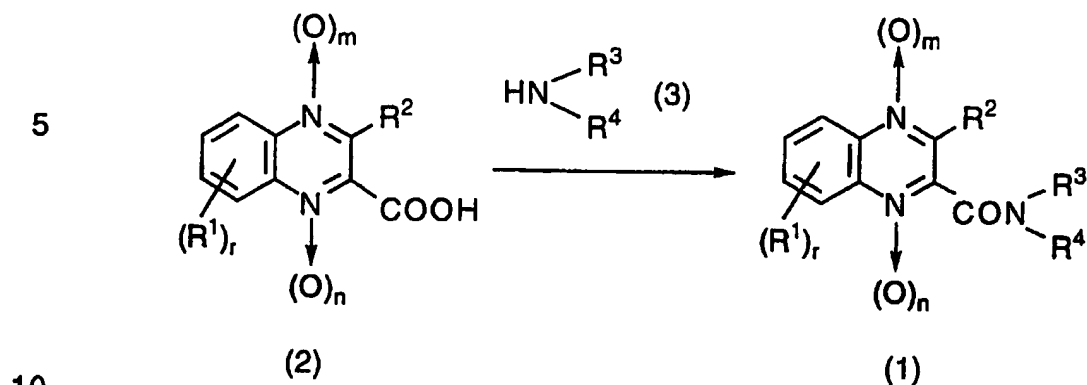


includes, for example, benzofuryl, benzothiazolyl, carbostyryl, 3,4-dihydrocarbostyryl, furo[3,2-c]pyridyl, benzothienyl, and the like.

The compounds of the present invention of the formula (1) may be prepared by various processes, but preferably prepared by the following

- 193 -

processes.

Reaction Scheme-1

[wherein R¹, R², R³, R⁴, r, m and n are the same as defined above]

The reaction of the compound (2) and the compound (3) is carried out by a conventional amido bond producing reaction. The amido bond producing reaction can be carried out under the same conditions as those of the conventional amino bond producing reaction, for example,

(a) a mixed acid anhydride process, i.e. a process of reacting the carboxylic acid compound (2) with an alkyl halocarbonate to form a mixed acid anhydride and reacting the resultant with the amine compound (3),

(b) an activated ester process, i.e. a process of converting the carboxylic acid compound (2) into an activated ester such as p-nitrophenyl ester, N-hydroxysuccinimide ester, 1-hydroxybenzotriazole ester, etc., and reacting the resultant with the amine compound (3),

(c) a carbodiimide process, i.e. a process of condensing the carboxylic acid compound (2) and the amine compound (3) in the presence of an activating agent such as dicyclohexylcarbodiimide, carbonyldiimidazole, etc.,

(d) other processes, i.e. a process of converting the carboxylic acid compound (2) into a carboxylic anhydride by treating it with a dehydrating agent such as acetic anhydride, and reacting the resultant with the amine compound (3); a process of reacting an ester of the carboxylic acid compound (2) with a lower alcohol and the amine compound (3); a process of reacting an acid halide compound of the carboxylic acid compound (2), i.e. a carboxylic

- 194 -

acid halide, with the amine compound (3); a process of activating the carboxylic acid (2) with a phosphorus compound such as triphenylphosphine, diethyl chlorophosphate, etc., and reacting the resultant with the amine compound (3); a process of converting the carboxylic acid compound (2) into a N -
5 carboxyamino anhydride with a phosgene or chloroformic acid trichloromethyl ester, and reacting the resultant with the amine compound (3); a process of activating the carboxylic acid compound (2) with an acetylene compound such as trimethylsilylethoxyacetylene, etc., and reacting the resultant with the amine compound (3), and the like.

10 The mixed acid anhydride used in the above mixed acid anhydride process (a) is obtained by the known Schotten-Baumann reaction, and the reaction product is used without isolating from the reaction mixture for the reaction with the amine compound (3) to give the desired compound (1) of the present invention. The Schotten-Baumann reaction is usually carried out in
15 the presence of a basic compound. The basic compound is any conventional compounds used for the Schotten-Baumann reaction and includes, for example, organic basic compounds such as triethylamine, trimethylamine, pyridine, dimethylaniline, N-methylmorpholine, 4-dimethylaminopyridine, 1,5 - diazabicyclo[4.3.0]nonene-5 (DBN), 1,8-diazabicyclo[5.4.0]undecene-7 (DBU),
20 1,4-diazabicyclo[2.2.2]octane (DABCO), etc., and inorganic basic compounds such as potassium carbonate, sodium carbonate, potassium hydrogen carbonate, sodium hydrogen carbonate, etc. The reaction is usually carried out at a temperature from about -20°C to about 100°C, preferably at a temperature of 0°C to about 50°C, for about 5 minutes to about 10 hours,
25 preferably for 5 minutes to about 2 hours.

The reaction between the mixed acid anhydride thus obtained and the amine compound (3) is usually carried out at a temperature of -20°C to about 150°C, preferably at a temperature of 10°C to about 50°C, for 5 minutes to about 10 hours, preferably for about 5 minutes to 5 hours. The mixed acid
30 anhydride process is usually carried out in a solvent or without a solvent, and the solvent may be any conventional solvents which are usually used in the mixed acid anhydride process and includes, for example, halogenated hydrocarbons (e.g. methylene chloride, chloroform, dichloroethane, etc.),

- 195 -

aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), ethers (e.g. diethyl ether, dioxane, diisopropyl ether, tetrahydrofuran, dimethoxyethane, etc.), esters (e.g. methyl acetate, ethyl acetate, etc.), aprotic polar solvents (e.g. 1,1,3,3-tetramethylurea, N,N-dimethylformamide, dimethylsulfoxide, hexamethylphosphoric triamide, etc.), or a mixture of these solvents. The alkyl halocarbonate used in the mixed acid anhydride process includes, for example, methyl chloroformate, methyl bromoformate, ethyl chloroformate, ethyl bromoformate, isobutyl chloroformate, and the like. In said process, the carboxylic acid compound (2), the alkyl halocarbonate ester and the amine compound (3) are usually used in each equimolar amount, but preferably, the alkyl halocarbonate ester and the amine compound (3) are used each in an amount of about 1 to 1.5 mole to 1 mole of the carboxylic acid compound (2).

The activated ester process (b), for example, a process using N-hydroxysuccinic acid imide ester is carried out in a suitable solvent which does not affect the reaction, in the presence or absence of a basic compound. Besides, the reaction may be carried out with addition of a condensing agent such as dicyclohexylcarbodiimide, carbonyldiimidazole, 1-ethyl-3-(3'-dimethyl-aminopropyl)carbodiimide, etc. The basic compound may be any basic compounds for the above mentioned Schotten-Baumann reaction, and alkali metal carboxylates (e.g. sodium acetate, sodium benzoate, sodium formate, potassium acetate, lithium benzoate, cesium acetate, etc.), alkali metal halides (e.g. potassium fluoride, cesium fluoride, etc.), and the like. The solvent includes, for example, halogenated hydrocarbons (e.g. methylene chloride, chloroform, dichloroethane, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), ethers (e.g. diethyl ether, dioxane, tetrahydrofuran, dimethoxyethane, etc.), esters (e.g. methyl acetate, ethyl acetate, etc.), aprotic polar solvents (e.g. N,N-dimethylformamide, dimethylsulfoxide, hexamethylphosphoric triamide, etc.), or a mixture of these solvents. The reaction is carried out at a temperature of 0 to 150°C, preferably at a temperature of 10 to 100°C for 5 to 30 hours. The amine compound (3) and N-hydroxysuccinic acid imide ester are used each at least in equimolar amount, preferably in an amount of 1 to 2 moles to 1 mole of the carboxylic acid compound (2).

Besides, the amido bond producing reaction in Reaction Scheme-

- 196 -

1 may also be carried out by reacting the carboxylic acid compound (2) and the amine compound (3) in the presence of a condensing agent such as phosphorus compounds (e.g. triphenylphosphine, triphenylphosphine-2,2' - dipyridyldisulfide, diethyl chlorophosphate, diphenylphosphinyl chloride, phenyl-N-phenylphosphoramidate, diethyl cyanophosphate, bis(2-oxo - 3-oxazolidinyl)phosphinic chloride, etc.). The reaction is usually carried out in the presence of the solvent and the basic compound. The basic compound includes, for example, in addition to the basic compounds used for the above mentioned Schotten-Baumann reaction, sodium hydroxide, potassium hydroxide, etc. The solvent includes, for example, in addition to the solvents used in the mixed acid anhydride process (a), pyridine, acetone, acetonitrile, or a mixture of two or more above solvents. The reaction is usually carried out at a temperature of -20°C to about 150°C, preferably at a temperature of 0°C to about 100°C, for about 5 minutes to about 30 hours. The condensing agent and the amine compound (3) are used at least in equimolar amount, preferably in an amount of about 1 to 2 moles, to 1 mole of the carboxylic acid compound (2).

The amido bond producing reaction is also carried out by reacting the amine compound (3) and the carboxylic acid compound (2) in the presence of a condensing agent. The reaction is carried out in a suitable solvent in the presence or absence of a catalyst. The solvent includes, for example, halogenated hydrocarbons (e.g. dichloromethane, dichloroethane, chloroform, carbon tetrachloride, etc.), acetonitrile, dimethylformamide, etc. The catalyst includes, for example, organic bases such as dimethylaminopyridine, 4 - piperidinopyridine, etc., salts such as pyridinium tosylate, etc., camphorsulfonic acid, mercury oxide, and the like. The condensing agent includes, for example, acetylene compounds such as trimethylsilylethoxyacetylene, etc., and is used in an amount of 1 to 10 moles, preferably in an amount of 2 to 6 moles, to 1 mole of the amine compound (3). The carboxylic acid compound (2) is usually used at least in equimolar amount, preferably in an amount of 1 to 2 moles, to 1 mole of the amine compound (3). The reaction is usually carried out at a temperature of 0 to about 150°C, preferably at a temperature of room temperature to about 100°C, for about 1 to about 10 hours.

- 197 -

Among the above other processes (d), in case of the process of reacting the carboxylic acid halide with the amine compound (3), the reaction is usually carried out in the presence of a de-hydrogen halogenating agent in an appropriate solvent. The de-hydrogen halogenating agent is any conventional basic compounds and includes, for example, in addition to the basic compounds used for the above mentioned Schotten-Baumann reaction, sodium hydroxide, potassium hydroxide, sodium hydride, potassium hydride, and the like. The solvent includes, for example, in addition to the solvents used in the mixed acid anhydride process, alcohols (e.g. methanol, ethanol, propanol, butanol, 3-methoxy-1-butanol, ethylcellosolve, methylcellosolve, etc.), pyridine, acetone, acetonitrile, or a mixture of two or more these solvents, and the like. The amount of the amine compound (3) and the carboxylic acid halide is not critical, but the amine compound (3) is usually used at least in equimolar amount, preferably about 1 to 5 moles, to 1 mole of the carboxylic acid halide. The reaction is usually carried out at a temperature of about -20°C to about 180°C, preferably at a temperature of about 0°C to about 150°C, for about 5 minutes to about 30 hours.

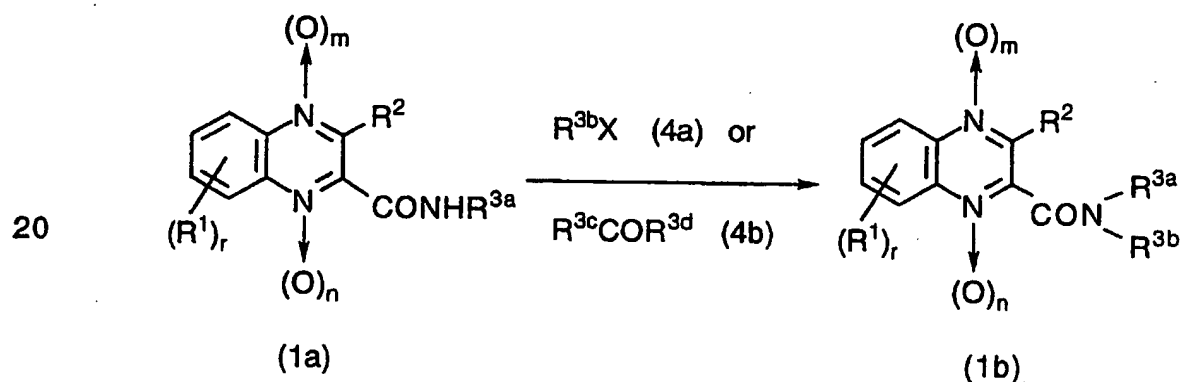
The carboxylic acid halide used in the above reaction may be prepared, for example, by reacting the carboxylic acid compound (2) with a halogenating agent in a solvent or without a solvent. The solvent may be any one which does not affect the reaction, for example, aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), halogenated hydrocarbons (e.g. chloroform, methylene chloride, carbon tetrachloride, etc.), ethers (e.g. dioxane, tetrahydrofuran, diethyl ether, etc.), dimethylformamide, dimethylsulfoxide, and the like. The halogenating agent may be any conventional one which convert the hydroxy group in carboxyl group into a halogen, for example, thionyl chloride, phosphorus oxychloride, phosphorus oxybromide, phosphorus pentachloride, phosphorus pentabromide, etc. The amount of the carboxylic acid compound (2) and the halogenating agent is not critical, but the halogenating agent is usually used in an excess amount to the carboxylic acid compound (2) when the reaction is carried out without a solvent, and when the reaction is carried out in a solvent, the hydrogenating agent is usually used at least in equimolar amount, preferably in an amount of 2 to 4 moles, to 1 mole of

- 198 -

the carboxylic acid compound (2). The reaction temperature and the reaction period are not necessarily specified, but the reaction is usually carried out at a temperature of room temperature to about 100°C, preferably at a temperature of 50 to 80°C, for 30 minutes for about 6 hours.

5 In the process of reacting the amine compound (3) with an ester of the carboxylic acid compound (2) and a lower alcohol, the reaction is carried out in a suitable solvent or without a solvent. The solvent may be any ones which are used in the above mentioned reaction of the carboxylic acid halide and the amine compound (3). The amine compound (3) is usually used at least
10 in equimolar amount, preferably in an amount of 1 to 15 moles, to 1 mole of the ester of the carboxylic acid compound (2) and a lower alcohol. The reaction is usually carried out at a temperature of room temperature to 150°C, preferably at a temperature of room temperature to about 120°C, for one to about 20 hours.

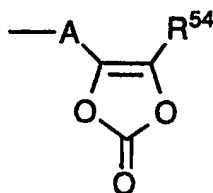
15 Reaction Scheme-2



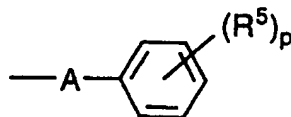
[wherein R¹, R², r, m and n are the same as defined above, X is a halogen
25 atom, R^{3a} is hydrogen atom, a lower alkyl group, a phenyl-lower alkoxy - carbonyl group, a lower alkanoyloxy-substituted lower alkyl group, e) a lower alkanoyl group, a lower alkoxy-carbonyl group, a lower alkoxy-lower alkyl group, a phenoxy-carbonyl group, a lower alkanoyl-substituted lower alkyl group, a lower alkoxy-carbonyloxy-substituted lower alkyl group, a benzoyl -
30 substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-NR⁵²R⁵³ (in which R⁵² and R⁵³ are the same or different and each hydrogen atom, a lower alkyl group, a lower

- 199 -

alkoxycarbonyl group or phenyl group, or R^{52} and R^{53} may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: -CO-, or a group of the formula: -CO-A- (in which A is a lower alkylene group)), a group of the formula:

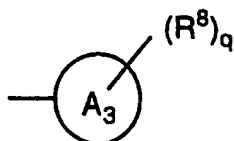


(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above), a group of the formula:



(in which A, R^5 and p are the same as defined above), a phenyl-lower alkenyl group which may optionally have a substituent on the phenyl moiety selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent, an alkenyl group, a cycloalkyl-lower alkyl group, a naphthyl-lower alkyl group, a phenylthio-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, a phenoxy-substituted lower alkyl group, a group of the formula:

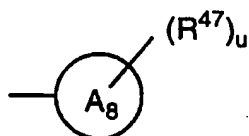
- 200 -



(in which a group of the formula: , R^8 and p are the same as defined

5 above), a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 , R^{42} , R^{43} and R^{44} are the same as defined above), a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent on the 2,3-dihydro-1H-indenyl ring selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent, or a group of the formula:

10



(in which a group of the formula: , R^{47} and u are the same as defined

15 above, R^{3b} is the same groups for the above mentioned R^{3a} except hydrogen atom, and R^{3c} and R^{3d} are each hydrogen atom or a lower alkyl group]

The reaction of the compound (1a) and the compound (4a) is usually carried out in the presence or absence of a basic compound in a suitable inert solvent. The inert solvent includes, for example, aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), ethers (e.g. tetrahydrofuran, dioxane, diethylene glycol dimethyl ether, etc.), alcohols (e.g. methanol, ethanol, isopropanol, butanol, etc.), ethyl acetate, acetone, acetonitrile, dimethylsulfoxide, dimethylformamide, hexamethylphosphoric triamide, or a mixture of these solvents. The basic compound includes, for example, an alkali metal carbonate (e.g. sodium carbonate, potassium carbonate, sodium

20 hydrogen carbonate, potassium hydrogen carbonate, etc.), an alkali metal hydroxide (e.g. sodium hydroxide, potassium hydroxide, etc.), sodium hydride, potassium, sodium, sodium amide, an alkali metal alcoholate (e.g. sodium methylate, sodium ethylate, etc.), organic basic compounds (e.g. pyridine, N -

25 ethyldiisopropylamine, dimethylaminopyridine, triethylamine, DBN, DBU,

- 201 -

DABCO, etc.), and the like. The amount of the compound (1a) and the compound (4a) is not critical, but the compound (4a) is used at least in equimolar amount, preferably in an amount of 1 to 10 moles, to 1 mole of the compound (1a). The reaction is usually carried out at a temperature of 0 to about 200°C, preferably at a temperature of 0 to about 170°C, for 30 minutes to 30 hours. The reaction may be carried out by adding an alkali metal halide compound such as sodium iodide, potassium iodide, etc., into the reaction system. Further, the reaction may be carried out by adding a halogenated ammonium such as tetra-n-butylammonium iodide, tetra-n-butylammonium bromide, n-butyl triethyl ammonium iodide, tetraethylammonium iodide, tri-n-butyl methyl ammonium iodide, etc., into the reaction system.

The reaction of the compound (1a) and the compound (4b) is usually carried out in the presence of a reducing agent in a suitable solvent or without a solvent. The solvent includes, for example, water, alcohols (e.g. methanol, ethanol, isopropanol, butanol, etc.), acetonitrile, formic acid, acetic acid, ethers (e.g. dioxane, diethyl ether, diglyme, tetrahydrofuran, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), or a mixture of these solvents. The reducing agent includes, for example, formic acid, alkali metal salts of fatty acid (e.g. sodium formate, etc.), hydrogenating-reducing agents (e.g. sodium borohydride, sodium cyanoborohydride, lithium aluminum hydride, etc.), catalytic reducing agents (e.g. palladium-black, palladium-carbon, platinum oxide, platinum black, Raney-nickel, etc.), and the like.

When formic acid is used as a reducing agent, the reaction is usually carried out at a temperature of room temperature to about 200°C, preferably at a temperature of 50 to about 150°C, for 1 to about 10 hours. The formic acid is used in an excess amount to the compound (1a).

When a hydrogenating agent is used, the reaction is usually carried out at a temperature of -30 to about 100°C, preferably at a temperature of 0 to about 70°C, for 30 minutes to about 15 hours. The reducing agent is used in an amount of 1 to 20 moles, preferably in an amount of 1 to 6 moles, to 1 mole of the compound (1a). When lithium aluminum hydride is used as a reducing agent, the solvent may preferably ethers (e.g. diethyl ether, dioxane, tetrahydrofuran, diglyme, etc.) and aromatic hydrocarbons (e.g. benzene,

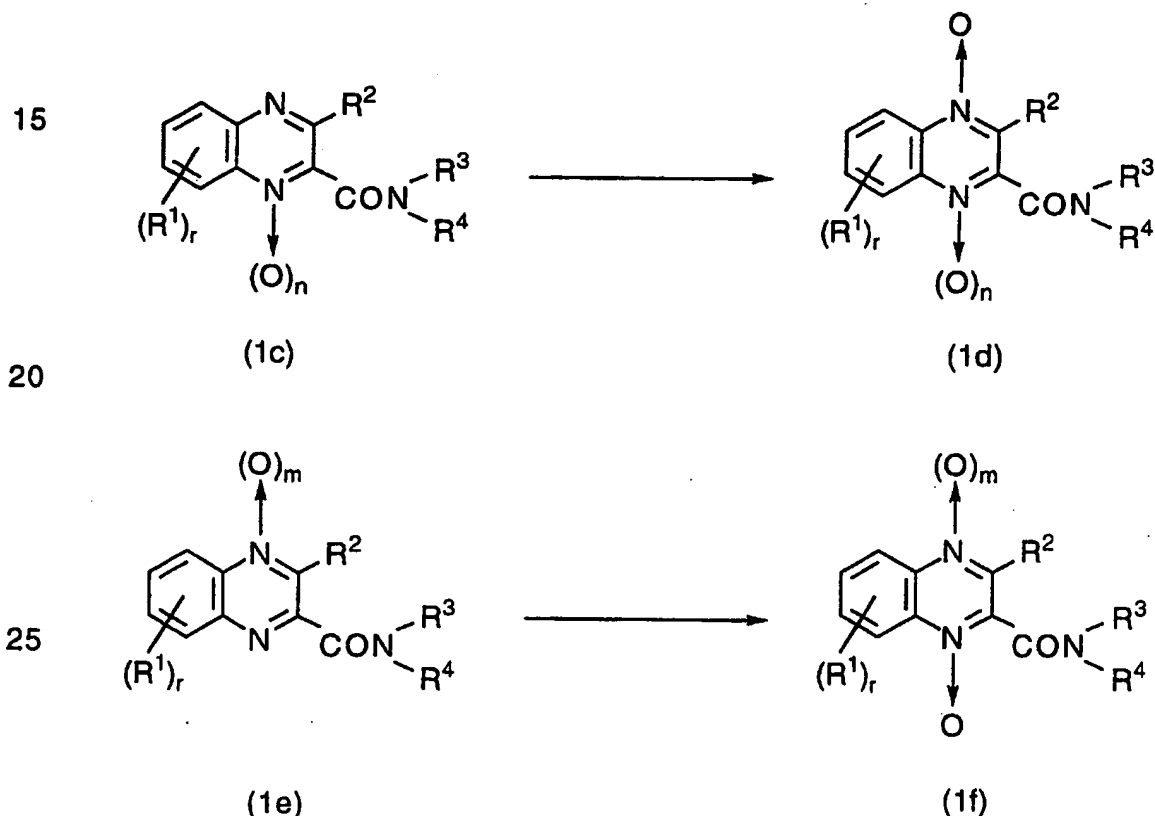
- 202 -

toluene, xylene, etc.).

When a catalytic reducing agent is used, the reaction is usually carried out under atmospheric pressure or 20 atms. of hydrogen gas, preferably under atmospheric pressure or about 10 atms. of hydrogen gas, or in the presence of a hydrogen-donor such as formic acid, ammonium formate, cyclohexene, hydrazine hydrate, etc., at a temperature of -30 to about 100°C, preferably at a temperature of 0 to about 60°C, for 1 to 12 hours. The catalytic reducing agent is usually used in an amount of 0.1 to 40 % by weight, preferably 1 to 20 % by weight, to the compound (1a).

The compound (4b) is usually used at least in equimolar amount, preferably in an amount of 1 to excess amount, to 1 mole of the compound (1a).

Reaction Scheme-3



[in which R^1 , R^2 , R^3 , R^4 , r , m and n are the same as defined above]

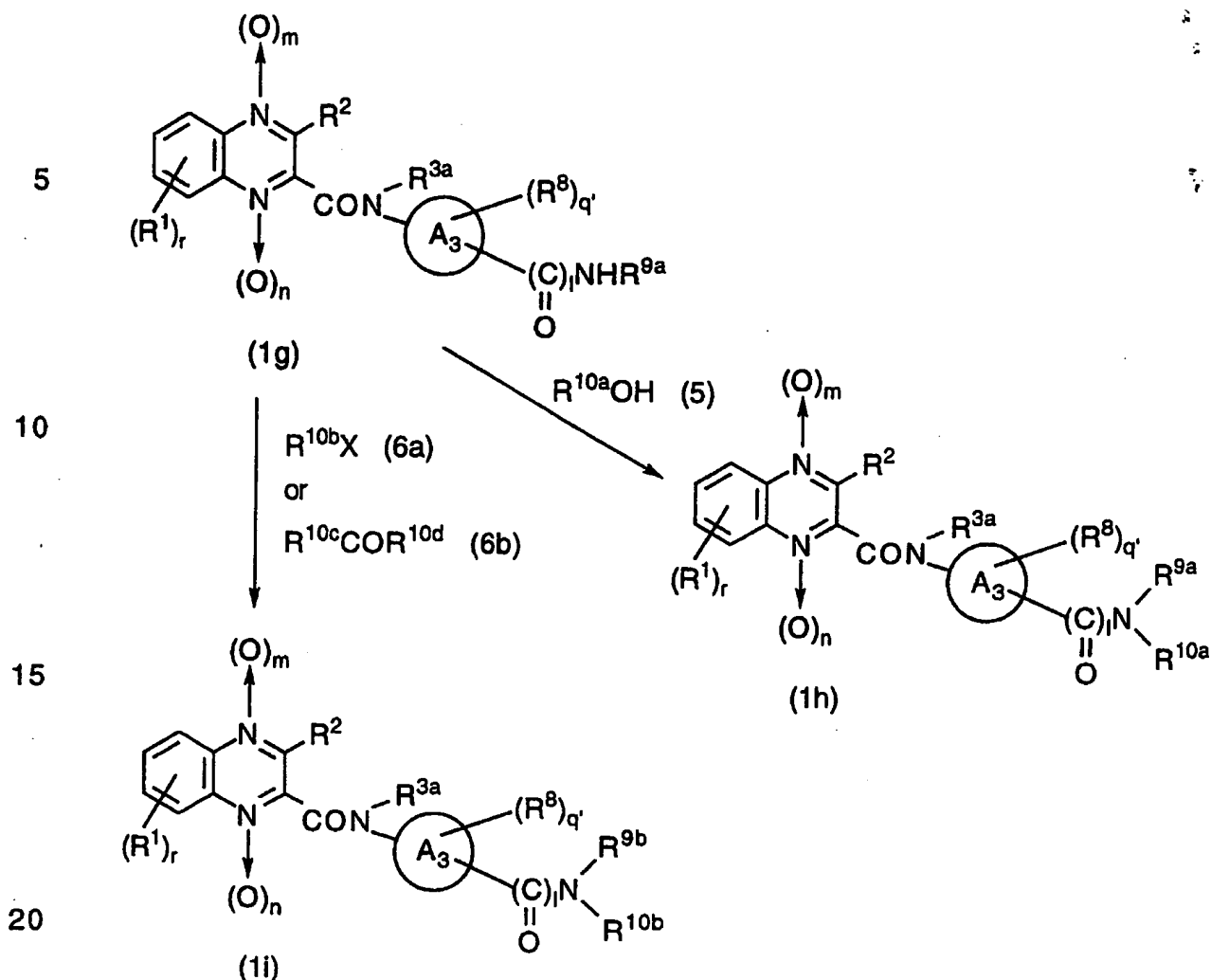
The reaction of converting the compound (1c) into the compound (1d), and the reaction of converting the compound (1e) into the compound (1f) are carried out in the presence of an oxidizing agent in a suitable solvent. The

- 203 -

solvent includes, for example, water, organic acids (e.g. formic acid, acetic acid, trifluoroacetic acid, etc.), alcohols (e.g. methanol, ethanol, etc.), halogenated hydrocarbons (e.g. chloroform, dichloromethane, etc.), or a mixture of these solvents. The oxidizing agent includes, for example, peracids (e.g. performic acid, peracetic acid, pertrifluoroacetic acid, perbenzoic acid, m-chloro -
5 perbenzoic acid, p-carboxyperbenzoic acid, etc.), hydrogen peroxide, sodium metaperiodate, dichromic acid, dichromates (e.g. sodium dichromate, potassium dichromate, etc.), permanganic acid, permanganates (e.g. potassium permanganate, sodium permanganate, etc.), lead salts (e.g. lead
10 tetraacetate, etc.), and the like. The oxidizing agent is usually used at least in equimolar amount, preferably in an amount of 1 to 2 moles, to 1 mole of the starting compound. The above reaction is usually carried out at a temperature of -10 to 40°C, preferably at a temperature of -10°C to room temperature, for about 1 to 100 hours.

15

- 204 -

Reaction Scheme-4

[wherein R^1 , R^2 , R^{3a} , R^8 , a group of the formula: $\text{---} \bigcirc_{A_3}$, r , m , n , X and l are

the same as defined above, R^{9a} is hydrogen atom, a lower alkanoyl group, a lower alkyl group, a morpholinocarbonyl-lower alkyl group, a cycloalkyl -
 25 carbonyl group, a phenyl-lower alkenylcarbonyl group, a lower alkylsulfonyl group, an aminocarbonyl group which may optionally have a lower alkyl substituent, a phenylsulfonyl group which may optionally have a lower alkyl substituent on the phenyl moiety, a phenyl-lower alkenyl group, a benzoyl group which may optionally have 1 to 3 substituents on the phenyl moiety
 30 selected from a halogen atom, a lower alkoxy group, an amino group having optionally a lower alkanoyl substituent and hydroxy group, an amino-

- 205 -

substituted lower alkanoyl group which may optionally have a lower alkanoyl substituent, an amino-substituted sulfonyl group which may optionally have a lower alkyl substituent, a phenyl-lower alkyl group, phenyl group and an amino group which may optionally have a lower alkanoyl substituent, R^{10a} is a lower alkanoyl group, a cycloalkylcarbonyl group, a phenyl-lower alkenylcarbonyl group, a benzoyl group which may optionally have 1 to 3 substituents on the phenyl moiety selected from a halogen atom, a lower alkoxy group, an amino group having optionally a lower alkanoyl substituent and hydroxy group, and an amino-substituted lower alkanoyl group which may optionally have a lower alkanoyl substituent, R^{10b} is a lower alkyl group, a morpholinocarbonyl-lower alkyl group, a lower alkenylsulfonyl group, an aminocarbonyl group which may optionally have a lower alkyl substituent, a phenylsulfonyl group which may optionally have a lower alkyl substituent, a phenyl-lower alkenyl group, an amino-substituted sulfonyl group which may optionally have a lower alkyl substituent, or a phenyl-lower alkyl group, q' is 1 or 2, R^{10c} and R^{10d} are each hydrogen atom or a lower alkyl group]

The reaction of the compound (1g) and the compound (5) is carried out under the same conditions as those of the reaction of the compound (2) and the compound (3) in the above mentioned Reaction Scheme-1.

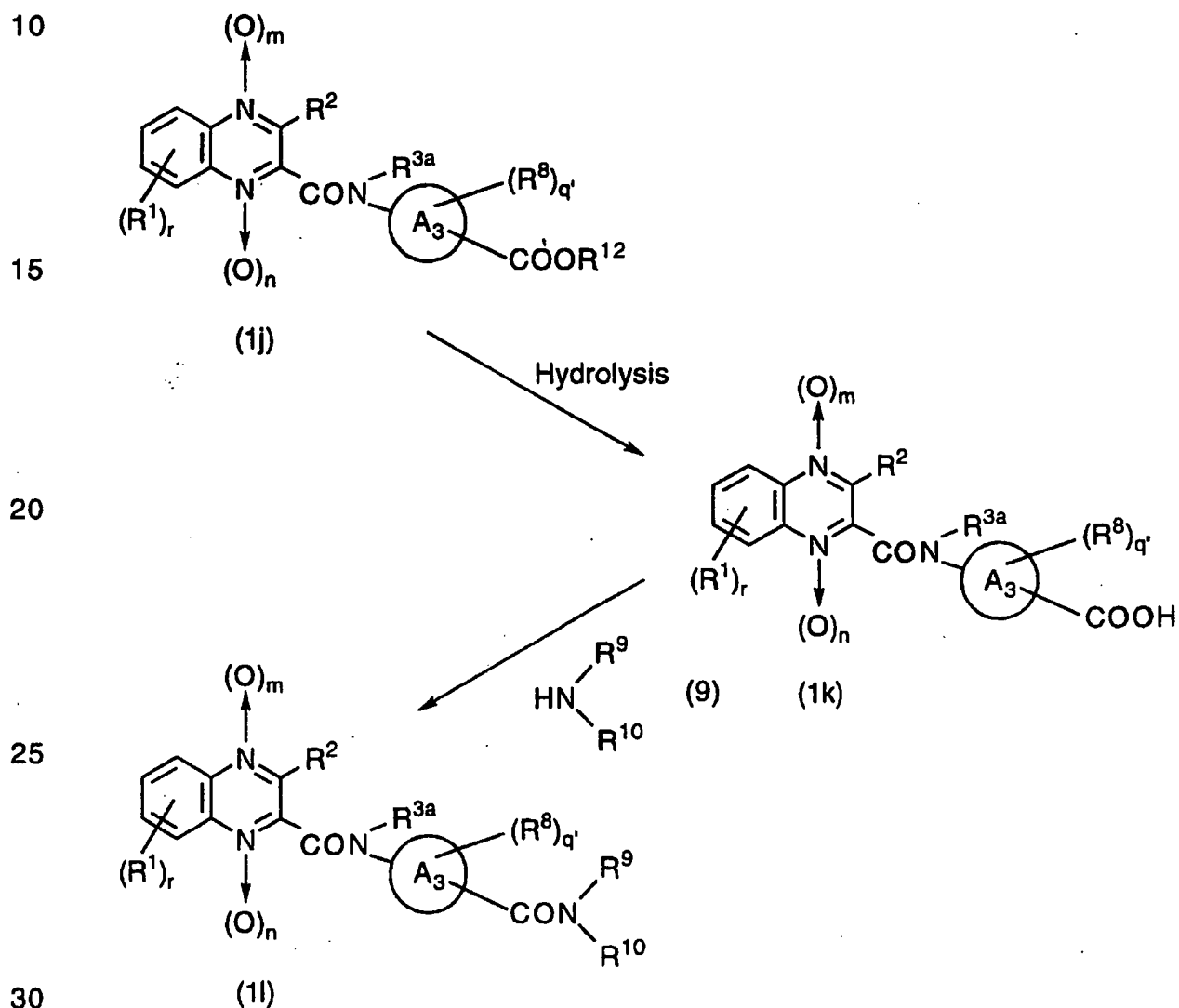
The compound (1h) wherein R^{10a} is a lower alkanoyl group may be derived from the compound (1g) by subjecting the compound (1g) to lower alkanoylization with using a compound of the formula: (R¹¹)₂O (7) or R¹¹X (8) (in which R¹¹ is a lower alkanoyl group, and X is the same as defined above). The lower alkanoylization reaction is carried out in the presence or absence of a basic compound. The basic compound includes, for example, an alkali metal (e.g. sodium, potassium, etc.), hydroxides, carbonates and hydrogen carbonates of these alkali metals, or organic basic compounds (e.g. N,N - dimethylaminopyridine, pyridine, piperidine, etc.), and the like. The reaction is carried out in a solvent or without a solvent. The solvent includes, for example, ketones (e.g. acetone, methyl ethyl ketone, etc.), ethers (e.g. diethyl ether, dioxane, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), water, pyridine, and the like. The compound (7) or the compound (8) is used at

- 206 -

least in equimolar amount, preferably in an amount of 1 to excess amount, to 1 mole of the starting compound (1g). The reaction is carried out at a temperature of 0 to 200°C, preferably at a temperature of 0 to 150°C, for about 5 minutes to about 5 days.

5 The reaction of the compound (1g) and the compound (6a) or the compound (6b) is carried out under the same conditions as those of the reaction of the compound (1a) and the compound (4a) or the compound (4b) in the above mentioned Reaction Scheme-2.

Reaction Scheme-5



[wherein R^1 , R^2 , R^8 , R^{3a} , m , n , q' , R^9 , R^{10} , r and the group of the formula:

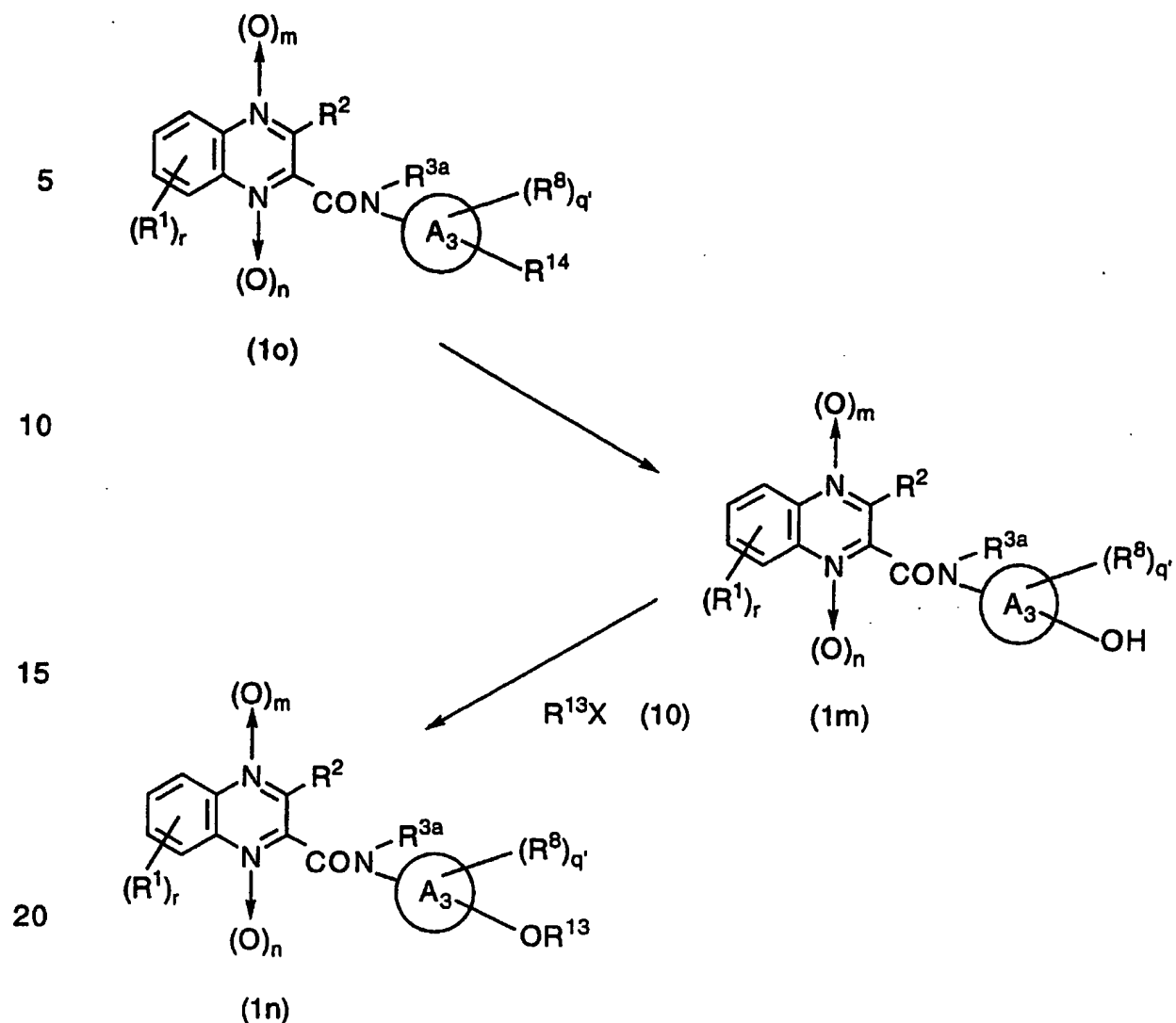
- 207 -

—  are the same as defined above, and R¹² is a lower alkyl group]

The hydrolysis of the compound (1j) is carried out in the presence of an acid or a basic compound in a suitable solvent or without a solvent. The solvent includes, for example, water, lower alcohols (e.g. methanol, ethanol, isopropanol, etc.), ketones (e.g. acetone, methyl ethyl ketone, etc.), ethers (e.g. dioxane, tetrahydrofuran, ethylene glycol dimethyl ether, etc.), fatty acids (e.g. acetic acid, formic acid, etc.), dimethylformamide, or a mixture of these solvents. The acid includes, for example, inorganic acids (e.g. hydrochloric acid, sulfuric acid, hydrobromic acid, etc.), and organic acids (e.g. formic acid, acetic acid, aromatic sulfonic acid, etc.). The basic compound includes, for example, alkali metal salts (e.g. sodium carbonate, potassium carbonate, etc.), alkali metal or alkaline earth metal hydroxides (e.g. sodium hydroxide, potassium hydroxide, calcium hydroxide, etc.), and the like. The reaction is usually carried out at a temperature of room temperature to about 200°C, preferably at a temperature of room temperature to about 150°C, for 10 minutes to about 25 hours.

The reaction of the compound (1k) and the compound (9) is carried out under the same conditions as for the reaction of the compound (2) and the compound (3) in the above mentioned Reaction Scheme-1.

Reaction Scheme-6



[wherein R^1 , R^2 , R^{3a} , R^8 , m , n , q' , X and the group of the formula: $\text{---} \text{A}_3$ are

the same as defined above, R^{13} is a lower alkyl group, a phenyl-lower alkyl group which may optionally have an amino substituent having optionally a lower alkanoyl substituent on the phenyl moiety, a carboxy-substituted lower alkyl group, a lower alkoxy-carbonyl-substituted lower alkyl group, a lower alkoxy-substituted lower alkyl group, a lower alkenyl group, a lower alkanoyl group, or a morpholinocarbonyl-lower alkyl group, and R^{14} is a lower alkoxy group, a phenyl-lower alkoxy group which may optionally have an amino substituent having optionally a lower alkanoyl substituent on the phenyl moiety,

- 209 -

a lower alkanoyloxy group or a lower alkoxy-substituted lower alkoxy group]

The reaction of converting the compound (1o) into the compound (1m) is carried out by reducing the compound (1o) when R¹⁴ is a phenyl-lower alkoxy group. The reduction reaction is carried out by subjecting the
5 compound (1m) to catalytic hydrogenation in the presence of a catalyst in a suitable solvent. The solvent includes, for example, water, acetic acid, alcohols (e.g. methanol, ethanol, isopropanol, etc.), hydrocarbons (e.g. hexane, cyclohexane, etc.), ethers (e.g. dioxane, tetrahydrofuran, diethyl ether, ethylene glycol dimethyl ether, etc.), esters (e.g. ethyl acetate, methyl acetate, etc.),
10 aprotic polar solvents (e.g. dimethylformamide, etc.), or a mixture of these solvents. The catalyst is, for example, palladium, palladium-black, palladium - carbon, platinum, platinum oxide, copper chromite, Raney-nickel, etc. and used in an amount of 0.02 to 1 part by weight to 1 part by weight of the compound (7). The reaction is usually carried out at a temperature of -20 to 100°C,
15 preferably at a temperature of 0 to about 80°C, under 1 to 10 atms of hydrogen gas, for 0.5 to 20 hours.

The reaction of converting the compound (1o) into the compound (1m) is carried out by subjecting the compound (1o) to hydrolysis when R¹⁴ is a lower alkoxy group or a lower alkoxy-substituted lower alkoxy group. The
20 hydrolysis is carried out in the presence of an acid in a suitable solvent. The solvent includes, for example, water, lower alcohols (e.g. methanol, ethanol, isopropanol, etc.), ethers (e.g. dioxane, tetrahydrofuran, etc.), halogenated hydrocarbons (e.g. dichloromethane, chloroform, carbon tetrachloride, etc.), polar solvents (e.g. acetonitrile, etc.), or a mixture of these solvents. The acid
25 includes, for example, inorganic acids (e.g. hydrochloric acid, sulfuric acid, hydrobromic acid, etc.), fatty acids (e.g. formic acid, acetic acid, etc.), Lewis acids (e.g. boron trifluoride, aluminum chloride, boron tribromide, etc.), iodides (e.g. sodium iodide, potassium iodide, etc.), a mixture of the above Lewis acid and a iodide, and the like. The reaction is usually carried out at a temperature
30 of 0 to 150°C, preferably at a temperature of room temperature to 100°C, for 0.5 to about 50 hours.

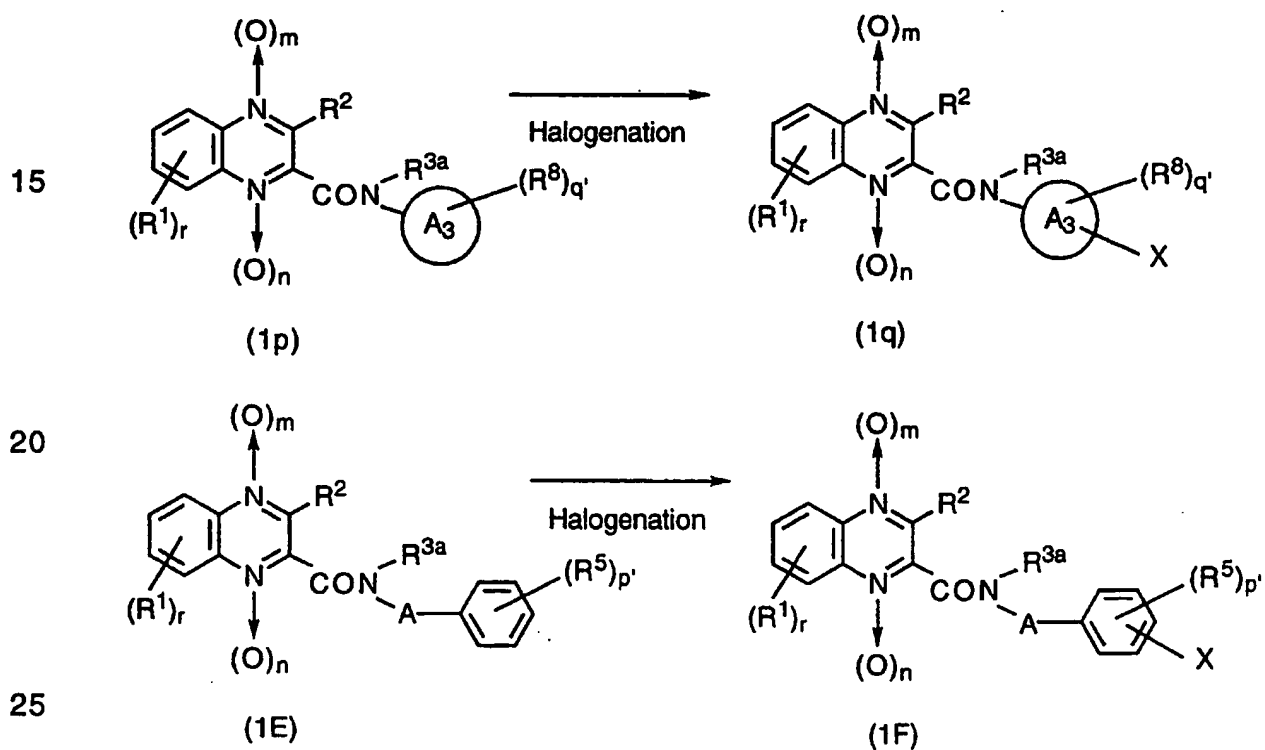
The reaction of converting the compound (1o) into the compound

- 210 -

(1m) is carried out in the same manner as in the hydrolysis of the compound (1j) in the above mentioned Reaction Scheme-5, when R^{14} is a lower alkanoyloxy group.

The reaction of the compound (1m) into the compound (10) is carried out under the same conditions as those of the reaction of the compound (1g) and the compound (6) in the above mentioned Reaction Scheme-4. The compound (1n) wherein R^{13} is a lower alkanoyl group is also prepared by reacting the compound (1m) and the compound (7) under the same conditions as those of the reaction of the compound (1g) and the compound (7) in the above mentioned Reaction Scheme-4.

Reaction Scheme-7



[wherein R^1 , R^2 , R^{3a} , R^5 , R^8 , m , n , q' , A , X , r and the group of the formula:

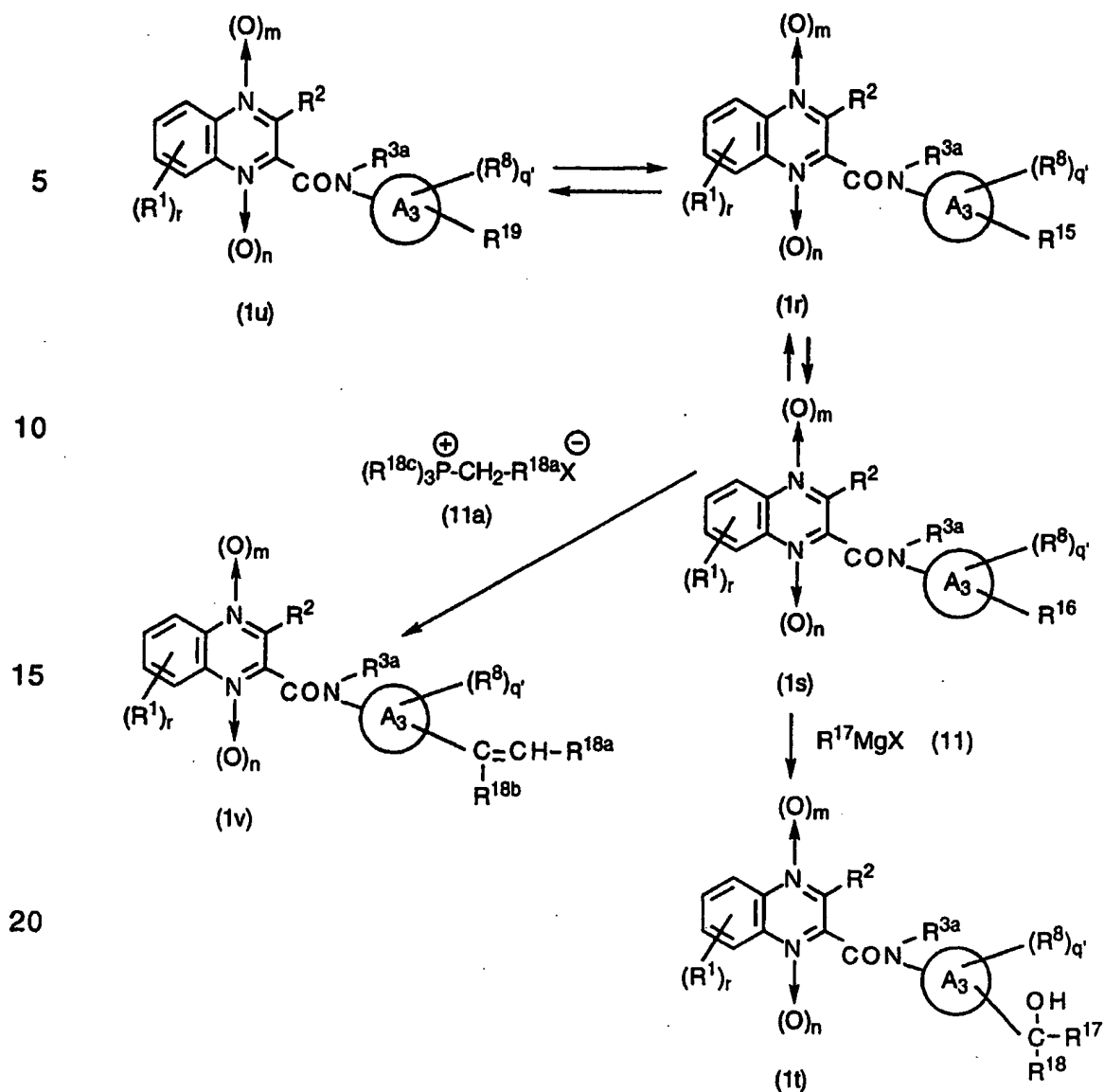
 are the same as defined above, and p' is 1 or 2]

The halogenation reaction of the compound (1p) or the compound (1E) is carried out in the presence of a conventional halogenating agent. The halogenating agent may be any conventional ones, for example, a halogen

- 211 -

atom (e.g. bromine, chlorine, etc.), or halogenating agents such as iodine monochloride, sulfuryl chloride, N-halogenosuccinimides (e.g. N-bromo - succinimide, N-chlorosuccinimide, etc.). The halogenating agent is used at least in equimolar amount, preferably in an amount of 1 to 1.5 mole, to 1 mole o
5 the compound (1p) or the compound (1E). The solvent includes, for example, halogenated hydrocarbons (e.g. dichloromethane, dichloroethane, chloroform, carbon tetrachloride, etc.), acetic acid, propionic acid, water, or a mixture of these solvents. The reaction is carried out at a temperature of 0°C to a boiling point of the solvent to be used, preferably at a temperature of 0 to 100°C, for 1
10 to about 10 hours.

- 212 -

Reaction Scheme-8

[wherein R^1 , R^2 , R^{3a} , R^8 , m , n , q' , X , r , and the compound of the formula:

25 — A_3 are the same as defined above, R^{15} is a lower alkyl group having a hydroxy substituent, R^{16} is a lower alkanoyl group, R^{17} and R^{18} are each a lower alkyl group, R^{19} is a lower alkanoyloxy-substituted lower alkyl group, R^{18a} is a hydrogen atom or a lower alkyl group, R^{18c} is phenyl group, and R^{18b} is a lower alkyl group]

30 The reaction of converting the compound (1r) into the compound (1s) is carried out in the presence of an oxidizing agent in a suitable solvent.

- 213 -

The oxidizing agent includes, pyridinium chromates (e.g. pyridinium chloro - chromate, pyridinium dichlorochromate, etc.), dimethylsulfoxide-oxazoyl - chloride, manganese dioxide, DDQ, chromic acid, chromites (e.g. sodium chromite, potassium chromite, etc.), permanganic acid, permanganates (e.g. potassium permanganate, sodium permanganate, etc.), and the like. The solvent includes, for example, water, organic acids (e.g. formic acid, acetic acid, trifluoroacetic acid, etc.), alcohols (e.g. methanol, ethanol, etc.), halogenated hydrocarbons (e.g. chloroform, dichloromethane, etc.), ethers (e.g. tetrahydrofuran, diethyl ether, dioxane, etc.), dimethylsulfoxide, dimethyl - formamide, or a mixture of these solvents. The oxidizing agent is usually used at least in equimolar amount, preferably in an amount of 1 to 30 moles, to 1 mole of the starting compound. The reaction is carried out at a temperature of 0 to 150°C, preferably at a temperature of 0 to 100°C, for 1 to about 10 hours.

The reaction of converting the compound (1r) into the compound (1s) is carried out by reacting the compound (1r) with an oxidizing agent in the presence of a co-oxidizing agent in a suitable solvent. The solvent includes, pyridine, ethers (e.g. dioxane, tetrahydrofuran, diethyl ether, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), halogenated hydrocarbons (e.g. dichloromethane, dichloroethane, chloroform, carbon tetrachloride, etc.), esters (e.g. ethyl acetate, etc.), water, alcohols (e.g. methanol, ethanol, isopropanol, t-butanol, etc.), or a mixture of these solvents. The co-oxidizing agent used therein includes, for example, N-oxides of organic amine such as pyridine N-oxide, N-ethyldiisopropylamine N-oxide, N-methylmorpholine N - oxide, trimethylamine N-oxide, triethylamine N-oxide, etc. The oxidizing agent includes, for example, tetra(n-propyl)ammonium perruthenate, and the like. The co-oxidizing agent is used at least in equimolar amount, preferably in an amount of 1 to 5 moles, to 1 mole of the starting compound. The oxidizing agent is used in a catalytic amount. The reaction is carried out at a temperature of -20 to 150°C, preferably at a temperature of 0 to 100°C, for 1 to about 20 hours. The reaction may proceed more advantageously by adding Molecular Sieves into the reaction system.

The reaction of converting the compound (1s) into the compound (1r) is carried out by a reduction reaction using a hydrogenating agent. The

- 214 -

hydrogenating agent includes, for example, lithium aluminum hydride, diboran, aluminum diisobutyl hydride, sodium borohydride, lithium borohydride, tetrabutylammonium borohydride, calcium borohydride, aluminum hydride, and the like, and is used at least in 0.1 mole amount, preferably in an amount of 0.1 to 15 moles, to 1 mole of the starting compound. The reduction reaction is usually carried out in a suitable solvent, for example, water, lower alcohols (e.g. methanol, ethanol, isopropanol, etc.), ethers (e.g. tetrahydrofuran, diethyl ether, diisopropyl ether, diglyme, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), or a mixture of these solvents, at a temperature of -60 to 150°C, preferably at a temperature of -30 to 100°C, for about 10 minutes to about 20 hours.

The reaction of the compound (1s) and the compound (11) is carried out in a suitable solvent. The solvent includes any solvents used for the Grignard reaction, and preferable ones are, for example, ethers (e.g. diethyl ether, dioxane, tetrahydrofuran, etc.), aromatic hydrocarbons (e.g. benzene, toluene, etc.), saturated hydrocarbons (e.g. pentane, hexane, heptane, cyclohexane, etc.), and the like. The compound (11) is usually used at least in equimolar amount, preferably in an amount of 1 to 2 moles, to 1 mole of the compound (1s). The reaction is carried out at a temperature of -70 to 100°C, preferably at -30 to about 70°C, for 1 to about 50 hours.

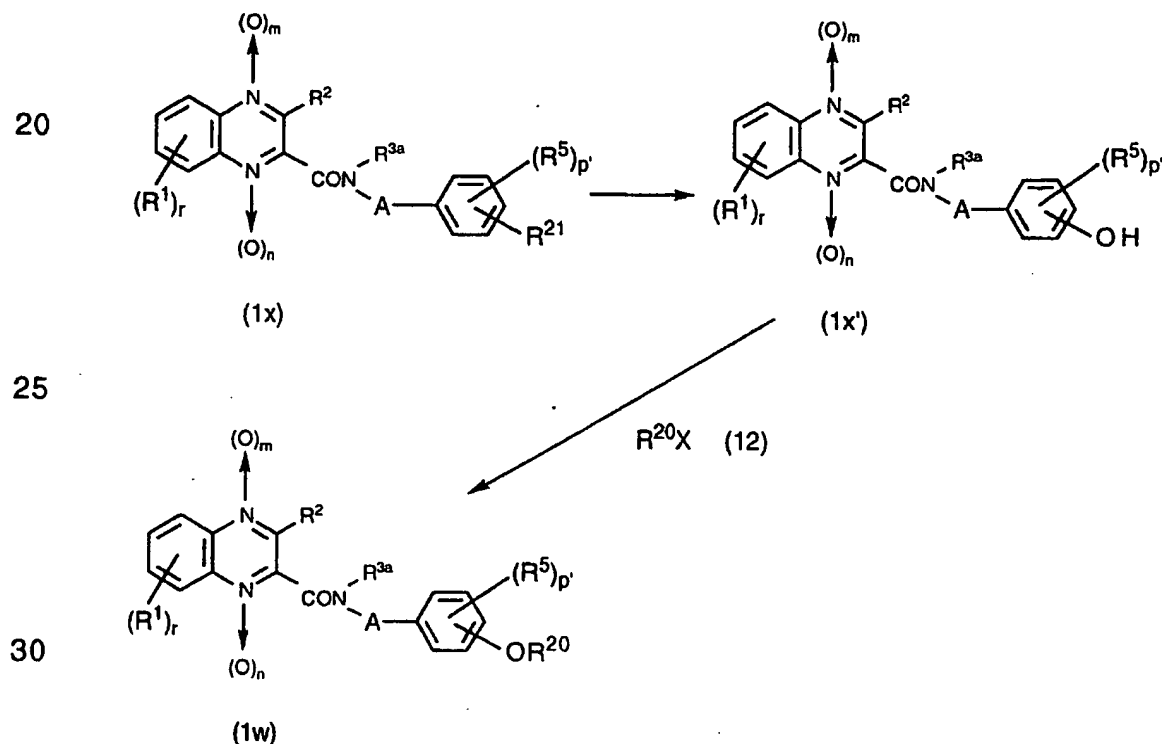
The reaction of converting the compound (1r) into the compound (1u) is carried out by reacting the compound (1r) with the compound (7) or the compound (8) under the same conditions as those of the reaction of the compound (1h) and the compound (7) or the compound (8) in the above mentioned Reaction Scheme-4.

The reaction of converting the compound (1u) into the compound (1r) is carried out under the same conditions as those of the hydrolysis of the compound (1j) in the above mentioned Reaction Scheme-5.

The reaction of the compound (1s) and the compound (11a) is carried out in the presence of a basic compound in a suitable solvent. The basic compound includes, for example, inorganic bases such as metal sodium, metal potassium, sodium hydride, sodium amide, sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, sodium hydrogen

- 215 -

carbonate, and organic bases such as alkali metal alcoholates (e.g. sodium methylate, sodium ethylate, potassium t-butoxide, etc.), an alkyl lithium, aryl lithium or lithium amide (e.g. methyl lithium, n-butyl lithium, phenyl lithium, lithium diisopropylamide, etc.), pyridine, piperidine, quinoline, triethylamine, N,N-dimethylaniline, and the like. The solvent may be any one which does not affect the reaction, for example, ethers (e.g. diethyl ether, dioxane, tetrahydrofuran, monoglyme, diglyme, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), aliphatic hydrocarbons (e.g. n-hexane, heptane, cyclohexane, etc.), amines (e.g. pyridine, N,N-dimethylaniline, etc.), aprotic polar solvents (e.g. N,N-dimethylformamide, dimethylsulfoxide, hexamethylphosphoric triamide, etc.), alcohols (e.g. methanol, ethanol, isopropanol, etc.), or a mixture of these solvents. The reaction is usually carried out at a temperature of -80 to 150°C, preferably at a temperature of -80 to about 120°C, for 0.5 to about 15 hours. The compound (11a) is used at least in equimolar amount, preferably in an amount of 1 to 10 moles, to 1 mole of the compound (1s).

Reaction Scheme-9

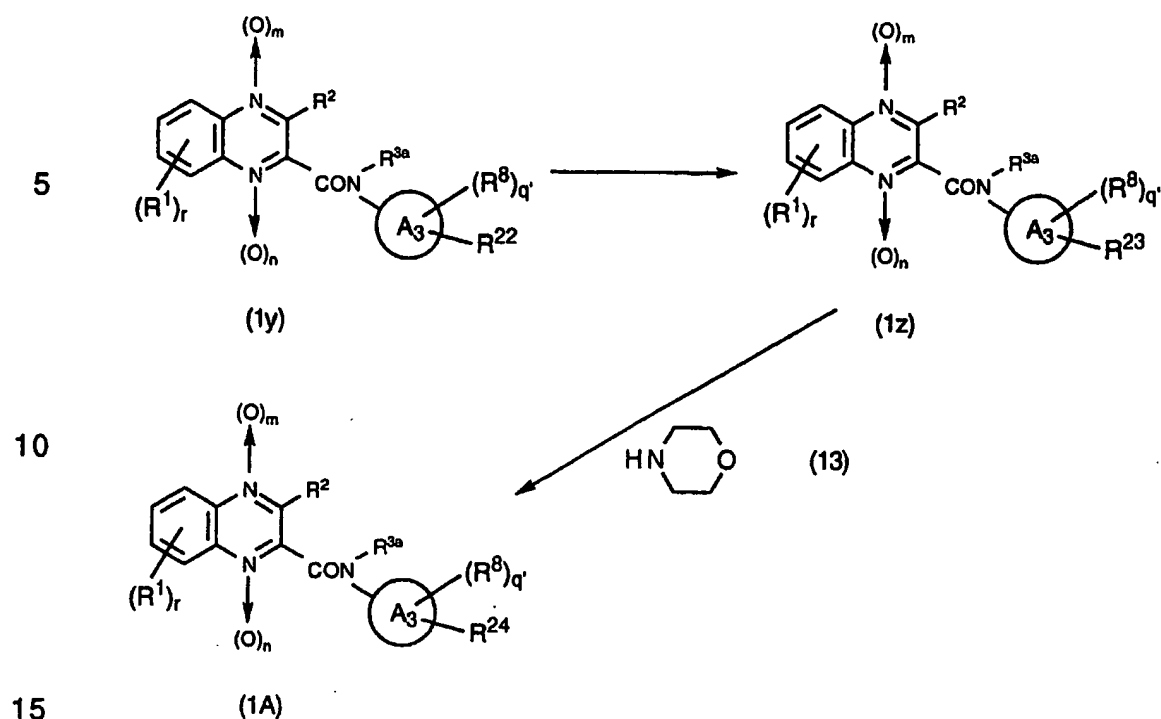
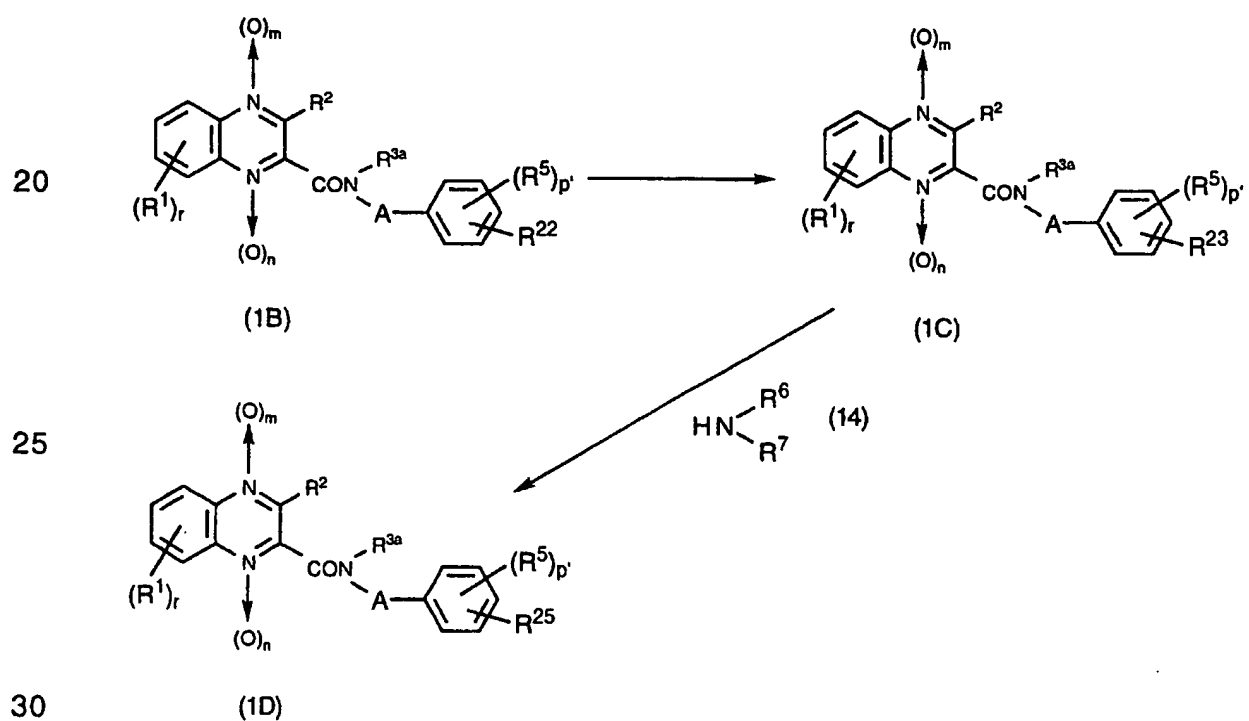
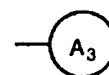
- 216 -

[wherein R¹, R², R^{3a}, R⁵, m, n, p', A, r and X are the same as defined above, R²⁰ is a lower alkyl group, a lower alkoxy-substituted lower alkyl group, a lower alkenyl group, a lower alkoxycarbonyl-substituted lower alkyl group, a hydroxy-substituted lower alkyl group, a carboxy-substituted lower alkyl group, a phenyl -
5 lower alkyl group which may optionally have a substituent selected from a lower alkyl group and a lower alkoxy group on the phenyl moiety, a morpholino-substituted lower alkyl group, or a group of the formula: -A₁-CO-NR⁶R⁷ (in which A₁, R⁶ and R⁷ are the same as defined above), and R²¹ is a lower alkoxy group, a lower alkoxy group-substituted lower alkoxy group, or a phenyl-lower
10 alkoxy group which may optionally have a substituent selected from a lower alkyl group and a lower alkoxy group on the phenyl moiety]

The reaction of converting the compound (1x) into the compound (1x') is carried out under the same conditions as those of the reaction of converting the compound (1o) into the compound (1m) in the above mentioned
15 Reaction Scheme-6.

The reaction of the compound (1x') and the compound (12) is carried out under the same conditions as those of the reaction of the compound (1m) and the compound (10) in the above mentioned Reaction Scheme-6.

- 217 -

Reaction Scheme-10aReaction Scheme-10b[wherein R¹, R^{3a}, R⁸, m, n, q', R⁵, p', r and the group of the formula:

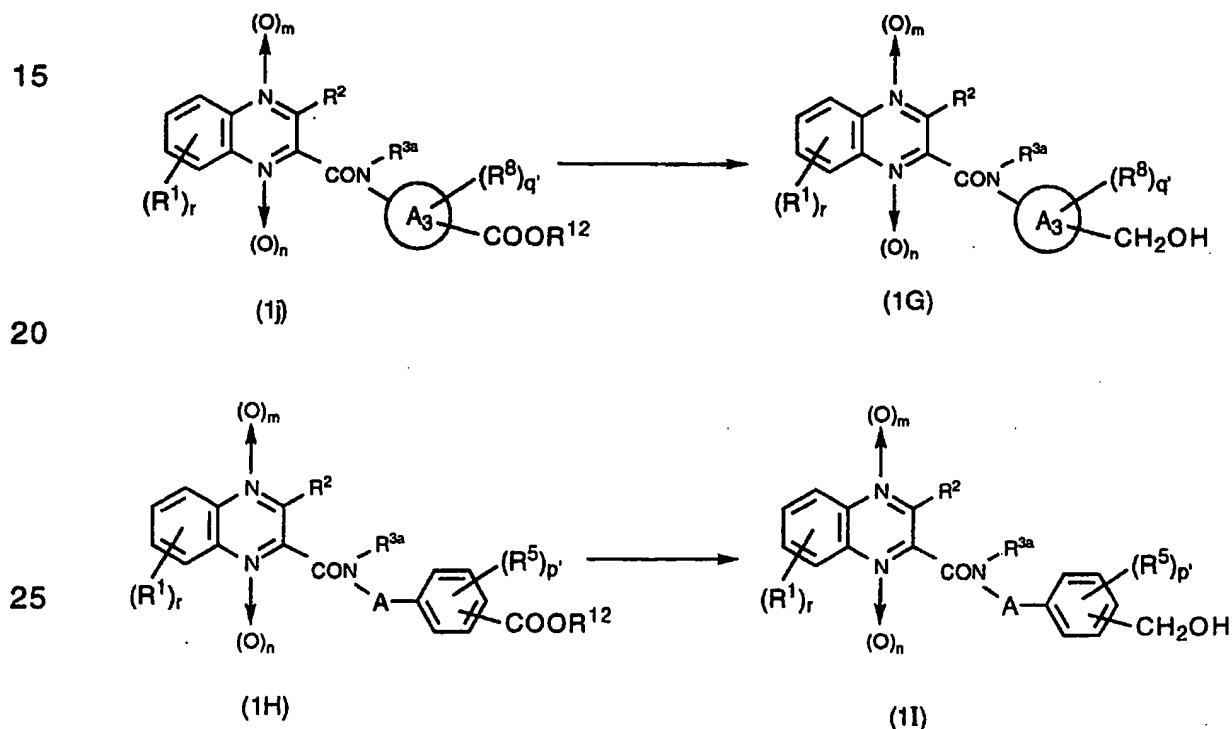
- 218 -

are the same as defined above, R^{22} is a lower alkoxy-carbonyl-substituted lower alkoxy group, R^{23} is a carboxy-substituted lower alkoxy group, R^{24} is a morpholinocarbonyl-lower alkoxy group, R^{25} is a group of the formula:
 $-O-A_1-CO-NR^6R^7$ (in which A_1 , R^6 and R^7 are the same as defined above)]

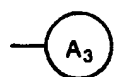
5 The reaction of converting the compound (1y) into the compound (1z) and the reaction of converting the compound (1B) into the compound (1C) are carried out under the same conditions as those of the hydrolysis of the compound (1j) in the above mentioned Reaction Scheme-5.

10 The reaction of the compound (1z) and the compound (13) and the reaction of the compound (1C) and the compound (14) are carried out under the same conditions as those of the reaction of the compound (2) and the compound (3) in the above mentioned Reaction Scheme-1.

Reaction Scheme-11



[wherein R^1 , R^2 , R^8 , R^{3a} , m , n , q' , R^{12} , R^5 , p' , A , r and the group of the formula:



are the same as defined above]

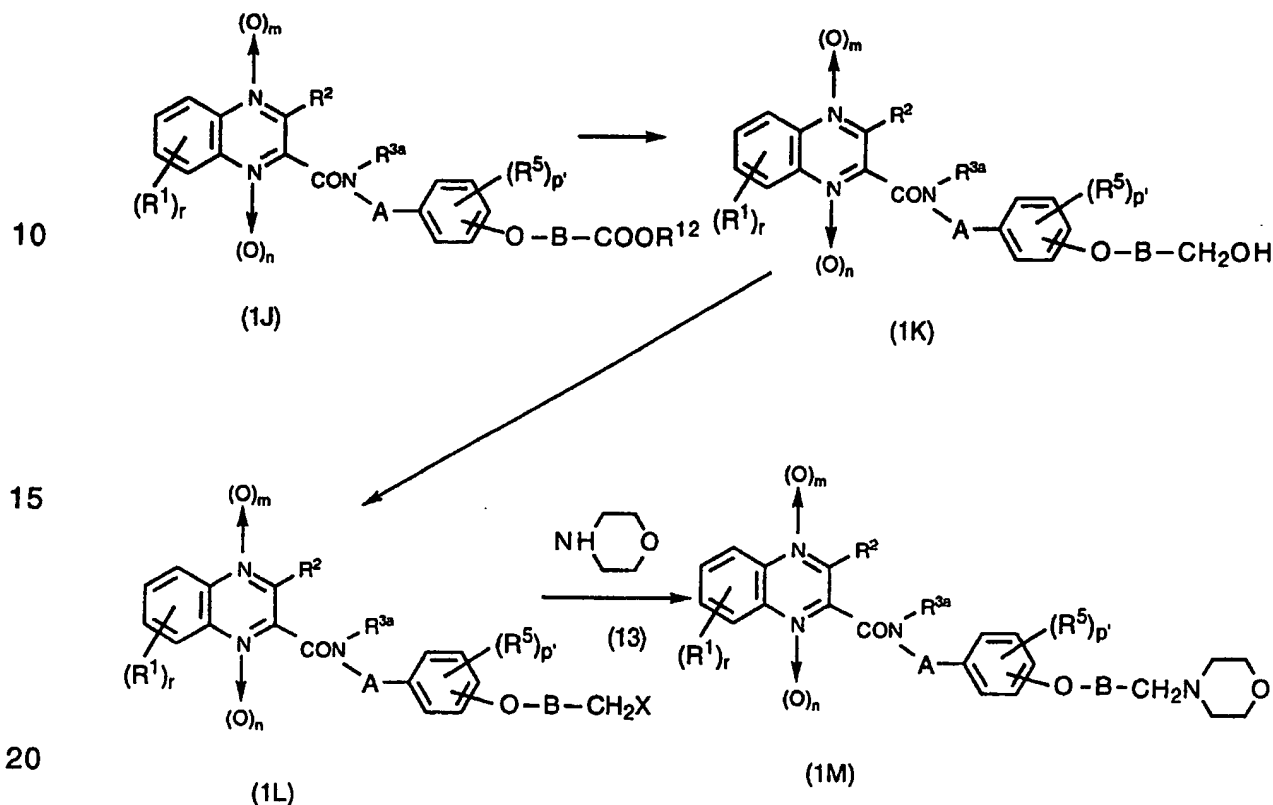
30

The reaction of converting the compound (1j) into the compound

- 219 -

(1G) and the compound of converting the compound (1H) into the compound (1I) are carried out under the same conditions as those of the reaction of converting the compound (1s) into the compound (1r) in the above mentioned Reaction Scheme-8.

Reaction Scheme-12



[wherein R^1 , R^2 , R^{3a} , R^5 , A , m , n , p' , R^{12} , r and X are the same as defined above and B is a lower alkylene group]

The reaction of converting the compound (1J) into the compound (1K) is carried out under the same conditions as those of the reaction of converting the compound (1s) into the compound (1r) in the above mentioned Reaction Scheme-8.

The reaction of converting the compound (1K) into the compound (1L) is carried out by reacting the compound (1K) with a halogenating agent in a suitable solvent or without a solvent. The halogenating agent includes, for example, inorganic acids (e.g. hydrochloric acid, hydrobromic acid, etc.), N,N - diethyl-1,2,2-trichlorovinylamide, phosphorus pentachloride, phosphorus

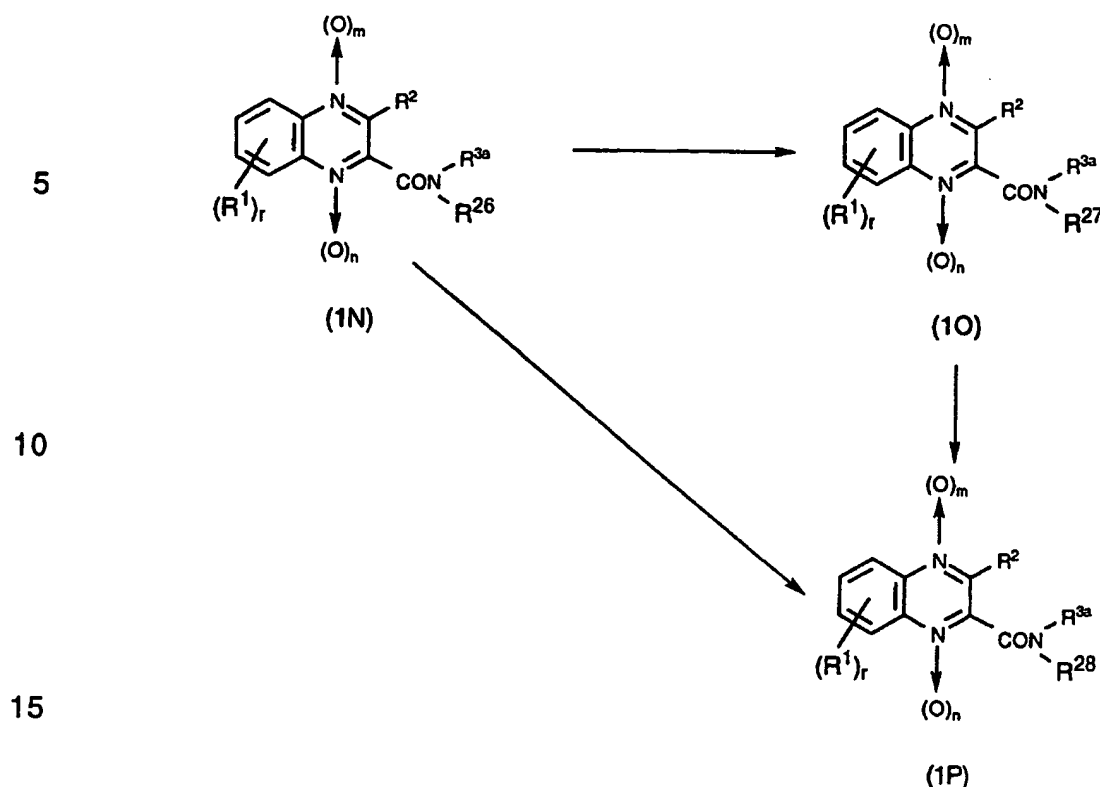
- 220 -

pentabromide, phosphorus oxychloride, thionyl chloride, mesyl chloride, tosyl chloride, etc., and a basic compound, carbon tetrachloride or carbon tetrabromide and triphenylphosphine. The basic compound may be the same as the above mentioned basic compounds for the reaction of the carboxylic halide and the amine compound in Reaction Scheme-1. The solvent includes, for example, ethers (e.g. dioxane, tetrahydrofuran, etc.), halogenated hydrocarbons (e.g. chloroform, methylene chloride, carbon tetrachloride, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), and the like. When a phenyl-lower alkyl halide (e.g. tosyl chloride, etc.) and a basic compound are used as a halogenating agent, the halogenating agent is used at least in equimolar amount, preferably in 1 to 2 moles, to 1 mole of the compound (1K). When other halogenating agents are used, the halogenating agent is used at least in equimolar amount, preferably in an excess amount, to 1 mole of the compound (1K). The reaction is usually carried out at a temperature of room temperature to 150°C, preferably at a temperature of room temperature to 80°C, for 1 to about 80 hours.

The reaction of the compound (1L) and the compound (13) is carried out under the same conditions as those of the reaction of the compound (1a) and the compound (4a) in the above mentioned Reaction Scheme-2.

20

- 221 -

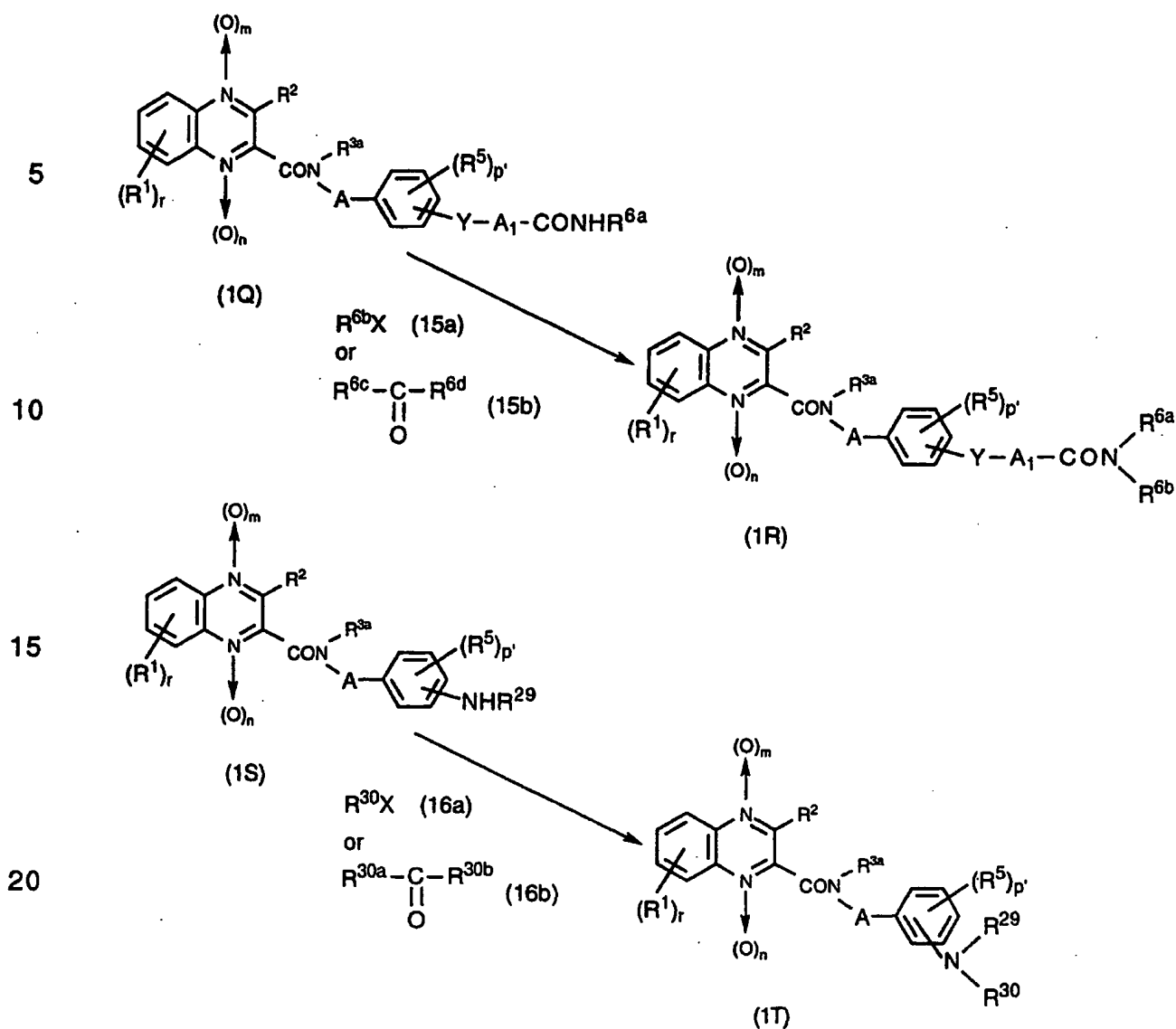
Reaction Scheme-13

[wherein R^1 , R^2 , R^{3a} , r , m and n are the same as defined above, R^{26} is a phenylthio-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, R^{27} is a phenylsulfinyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, and R^{28} is a phenylsulfonyl-substituted lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety]

The reaction of converting the compound (1N) into the compound (1O) and the reaction of converting the compound (1O) into the compound (1P) are carried out under the same conditions as those of the reaction of converting the compound (1c) into the compound (1d) in the above mentioned Reaction Scheme-3.

The reaction of converting the compound (1N) into the compound (1P) is carried out under the same conditions as those of the reaction of converting the compound (1N) and the compound (1O) except that the oxidizing agent is used at least in an amount of 2 moles, preferably in an amount of 2 to 4 moles, to 1 mole of the compound (1N).

- 222 -

Reaction Scheme-14

[wherein R^1 , R^2 , R^{3a} , R^5 , m , n , p' , X , A , A_1 , r and Y are the same as defined

25 above, R^{6a} is hydrogen atom, a lower alkyl group which may optionally have a hydroxy substituent, a phenyl-lower alkyl group which may optionally have a lower alkoxy substituent on the phenyl moiety, a furyl-lower alkyl group, or a lower alkoxy-substituted lower alkyl group, R^{6b} is the same groups for the above mentioned R^{6a} except hydrogen atom, R^{6c} and R^{6d} are each hydrogen atom or a lower alkyl group, R^{29} is hydrogen atom or a lower alkyl group, R^{30} is a lower alkyl group or a group of the formula: $-A_1CONR^{67}$ (in which A_1 , R^6

30

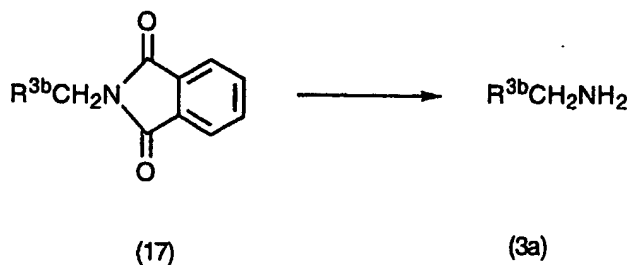
- 223 -

and R^7 are the same as defined above), R^{30a} and R^{30b} are each hydrogen atom or a lower alkyl group, provided that when R^{30} is a group of the formula: $-A_1CONR^6R^7$, R^{29} is hydrogen atom]

The reaction of the compound (1Q) and the compound (15a) and the reaction of the compound (1S) and the compound (16a) are each carried out under the same conditions as those of the reaction of the compound (1a) and the compound (4a) in the above mentioned Reaction Scheme-2. The reaction of the compound (1Q) and the compound (15b) and the reaction of the compound (1S) and the compound (16b) are each carried out under the same conditions as those of the reaction of the compound (1a) and the compound (4b) in the above mentioned Reaction Scheme-2.

The starting compound (2) or (3) may be prepared by the following processes.

Reaction Scheme-15



[wherein R^{3b} is the same as defined above, provided that the total number of carbon atoms of no-cyclic parts of a group of the formula: $R^{3b}\text{CH}_2-$ in the compound (3a) is not over 6]

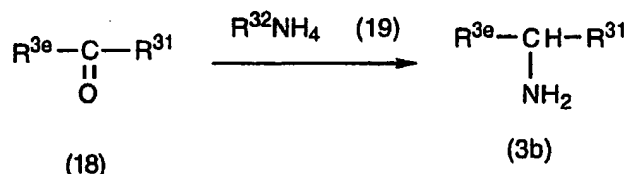
The reaction of converting the compound (17) into the compound (3a) is carried out by reacting the compound (17) with hydrazine in a suitable solvent or by subjecting the compound (17) to hydrolysis. The solvent used for the reaction of the compound (17) and hydrazine includes, for example, in addition to water, the same solvents for the reaction of the compound (2) and the compound (3) in the above mentioned Reaction Scheme-1. The reaction is usually carried out at a temperature of room temperature to about 120°C , preferably at a temperature of 0 to about 100°C , for 0.5 to about 10 hours. Hydrazine is used at least in equimolar amount, preferably in an amount of 1 to

- 224 -

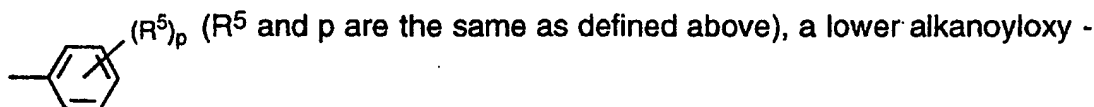
5 moles, to 1 mole of the compound (17).

The hydrolysis is carried out in the presence of an acid or a basic compound in a suitable solvent or without a solvent. The solvent includes, for example, water, lower alcohols (e.g. methanol, ethanol, isopropanol, etc.), ketones (e.g. acetone, methyl ethyl ketone, etc.), ethers (e.g. dioxane, tetrahydrofuran, ethylene glycol dimethyl ether, etc.), fatty acids (e.g. acetic acid, formic acid, etc.), or a mixture of these solvents. The acid includes, for example, inorganic acids (e.g. hydrochloric acid, sulfuric acid, hydrobromic acid, etc.), organic acids (e.g. formic acid, acetic acid, aromatic sulfonic acid, etc.), and the like. The basic compound includes, for example, alkali metal carbonates (e.g. sodium carbonate, potassium carbonate, etc.), alkali metal or alkaline earth metal hydroxides (e.g. sodium hydroxide, potassium hydroxide, calcium hydroxide, etc.), and the like. The reaction is usually carried out at a temperature of room temperature to about 200°C, preferably at a temperature of room temperature to about 150°C, for 10 minutes to about 25 hours.

Reaction Scheme-16

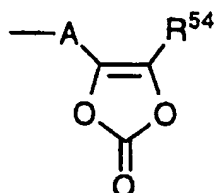


[wherein R³¹ is hydrogen atom, a lower alkyl group or a lower alkenyl group, R^{3e} is hydrogen atom, a lower alkyl group, a group of the formula: -(D)r'-R³³ (D is a lower alkylene group, r' is 0 or 1, R³³ is a group of the formula:

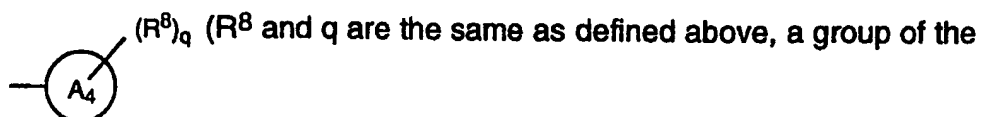


substituted lower alkyl group, a lower alkoxy-lower alkyl group, a lower alkanoyl-substituted lower alkyl group, a lower alkoxycarbonyloxy-substituted lower alkyl group, a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring, a group of the formula: -E-N(R⁵²)(R⁵³) (in which R⁵² and R⁵³ are the same as defined above, and E is a lower alkylene group), a group of the formula:

- 225 -



- 5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above), a cycloalkyl group; naphthyl group; a group of the formula:



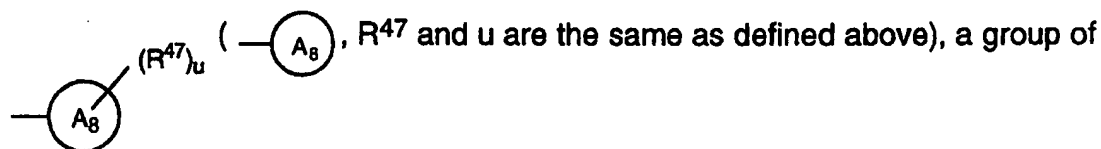
formula:  is a 5- to 14-membered saturated or unsaturated

- heteromonocyclic, heterobicyclic or heterotricyclic group having 1 to 4
 10 heteroatoms selected from nitrogen atom, oxygen atom and sulfur atom); a phenyl group which may optionally have a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having
 15 optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (A_4 , R^{40} and R^{41} are the same as defined above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl ring; a phenyl-lower alkenyl group which may optionally have a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent
 20 selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (A_4 , R^{40} and R^{41} are the same as defined
 25 above), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl ring; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl ring; a phenylsulfinyl-substituted lower alkyl group having optionally a lower

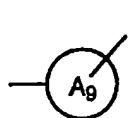
- 226 -

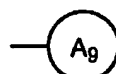
alkoxy substituent on the phenyl ring; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl ring; a phenoxy-substituted lower alkyl group, a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (A_5 , R^{42} , R^{43} and R^{44} are the same as defined above); a 2,3-dihydro-1H -

- 5 indenyl-substituted lower alkyl group which may optionally have a substituent selected from oxo group, hydroxy group a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring; a group of the formula:



the formula:



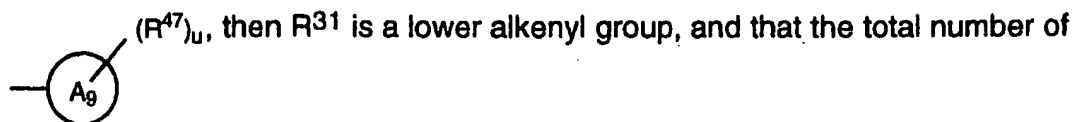
- 10 of the formula:  is a 5- to 14-membered unsaturated

heteromonocyclic, heterobicyclic or heterotricyclic group having 1 to 4 hetero - atoms selected from nitrogen atom, oxygen atom and sulfur atom), provided that wherein R^{3e} is a phenyl group which may optionally have a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl -

15 lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole ring, hydroxy group, a group of the formula:

$-O-A_4-CO-NR^{40}R^{41}$ (A_4 , R^{40} and R^{41} are the same as defined above), a lower

- 20 alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl ring, or a group of the formula:



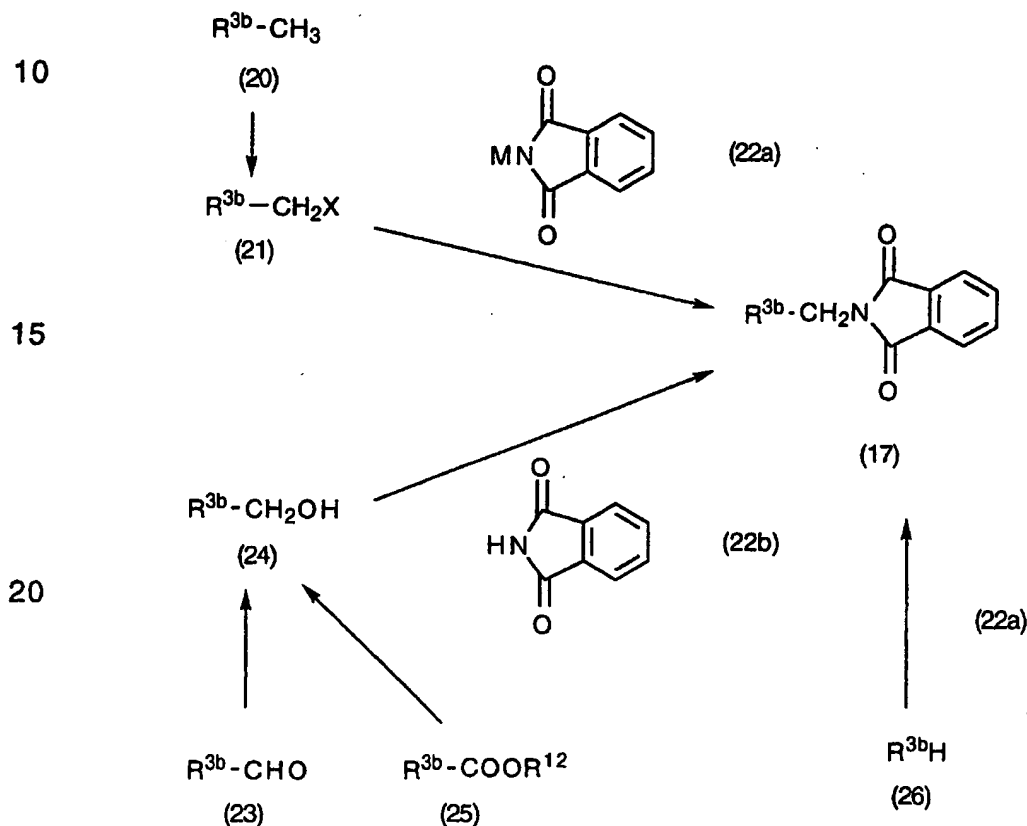
- 227 -

carbon atoms in non-cyclic part of the group of the formula: $(R^{3e})(R^{31})CH$ - in the compound (3b) is not over 6, and R^{32} is a lower alkanoyloxy group]

The reaction of the compound (18) and the compound (19) is carried out under the same conditions as those of the reaction of the compound (1a) and the compound (4b) in the above Reaction Scheme-2.

The starting compound (17) is prepared by the following processes.

Reaction Scheme-17



[wherein R^{3b} , R^{12} and X are the same as defined above, M is an alkali metal such as potassium, sodium, etc., provided that the total number of carbon atoms of non-cyclic part of the group of the formula: $-CH_2R^{3b}$ in the compound (17) is not over 6]

The reaction of converting the compound (20) into the compound (21) is carried out in the same manner as in the halogenation reaction of the compound (1p) in the above mentioned Reaction Scheme-7, but it is preferably carried out by adding to the reaction system a radical initiator such as 2-(4-

- 228 -

biphenyl)-5-phenyloxazole, azobisisobutyronitrile perbenzoic acid, etc., and a suitable amount of water (e.g. 3 mole %).

5 The reaction of the compound (21) and the compound (22a) is carried out under the same conditions as those of the reaction of the compound (1a) and the compound (4a) in the above Reaction Scheme-2.

The reaction of converting the compound (23) into the compound (24) is carried out under the same conditions as those of the reaction of converting the compound (1s) into the compound (1r) in the above Reaction Scheme-8.

10 The reaction of the compound (24) and the compound (22b) is carried out in a suitable solvent in the presence of an azodicarboxylic acid derivative such as dialkyl azodicarboxylate (e.g. diethyl azodicarboxylate, dibutyl azodicarboxylate, etc.) and a dialkylazodicarboxamide (e.g. 1,1' - azodicarbonyldipiperidine, etc.), and a phosphorus compound such as a
15 trialkylphosphine (e.g. trimethylphosphine, etc.) and a triarylphosphine (e.g. triphenylphosphine, etc.). The solvent may be the same solvents for the reaction of the compound (1a) and the compound (4a) in the above Reaction Scheme-2 except lower alcohols. The azodicarboxylic acid derivative, phosphorus compound and the compound (22) are each used at least in
20 equimolar amount, preferably in an amount of 1 to 1.5 mole, to 1 mole of the compound (24). The reaction is usually carried out at a temperature of 0 to 100°C, preferably at a temperature of 0 to about 70°C, for 1 to about 15 hours.

The reaction of converting the compound (25) into the compound (24) is carried out under the same conditions as those of the reaction of
25 converting the compound (1s) into the compound (1r) in the above Reaction Scheme-8.

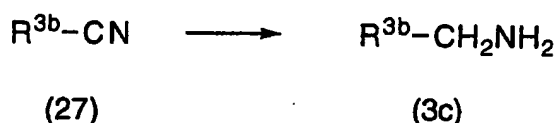
The reaction of the compound (26) and the compound (22a) is carried out in a suitable solvent in the presence of formaldehyde and an acid. The solvent includes, for example, halogenated hydrocarbons (e.g.
30 dichloromethane, dichloroethane, chloroform, carbon tetrachloride, etc.), water, alcohols (e.g. methanol, ethanol, isopropanol, etc.), alkanoic acids (e.g. acetic acid, propionic acid, etc.), acid anhydrides (e.g. acetic anhydride, etc.), polar solvents (e.g. acetone, dimethylformamide, etc.), or a mixture of these solvents.

- 229 -

The acid includes, for example, inorganic acids such as hydrogen chloride gas, hydrochloric acid, hydrobromic acid, etc. Formaldehyde includes, for example, an aqueous 20 to 40 % by weight formaldehyde solution, trimer of formaldehyde, polymer of formaldehyde, i.e. para-formaldehyde, and the like.

- 5 The compound (22a) is usually used at least in equimolar amount, preferably in an amount of 1 to 2 moles, to 1 mole of the compound (26). Formaldehyde is usually used at least in equimolar amount, preferably in an excess amount, to 1 mole of the compound (26). The reaction is carried out at a temperature of 0 to about 200°C, preferably at a temperature of room temperature to 150°C, for 0.5 to about 24 hours.

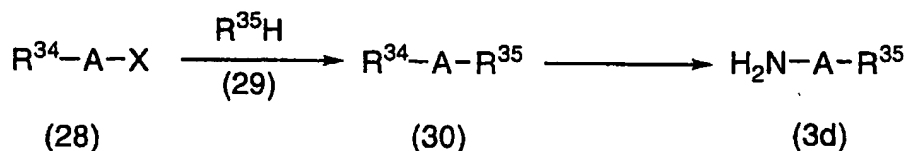
10 Reaction Scheme-18



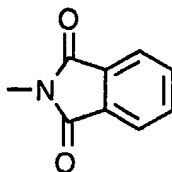
- 15 [wherein R^{3b} is the same as defined above]

The reaction of converting the compound (27) into the compound (3c) is carried out under the same conditions as those of the reaction of converting the compound (1s) into the compound (1r) in the above Reaction Scheme-8.

20 Reaction Scheme-19



- 25 [wherein R³⁴ is a group of the formula:

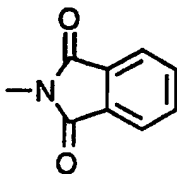


- 30 or a group of the formula: -NR³⁶R³⁷ (in which R³⁶ and R³⁷ are each a phenyl - lower alkyl group), R³⁵ is a phenylthio group having optionally a lower alkoxy substituent on the phenyl ring, and A is the same as defined above]

- 230 -

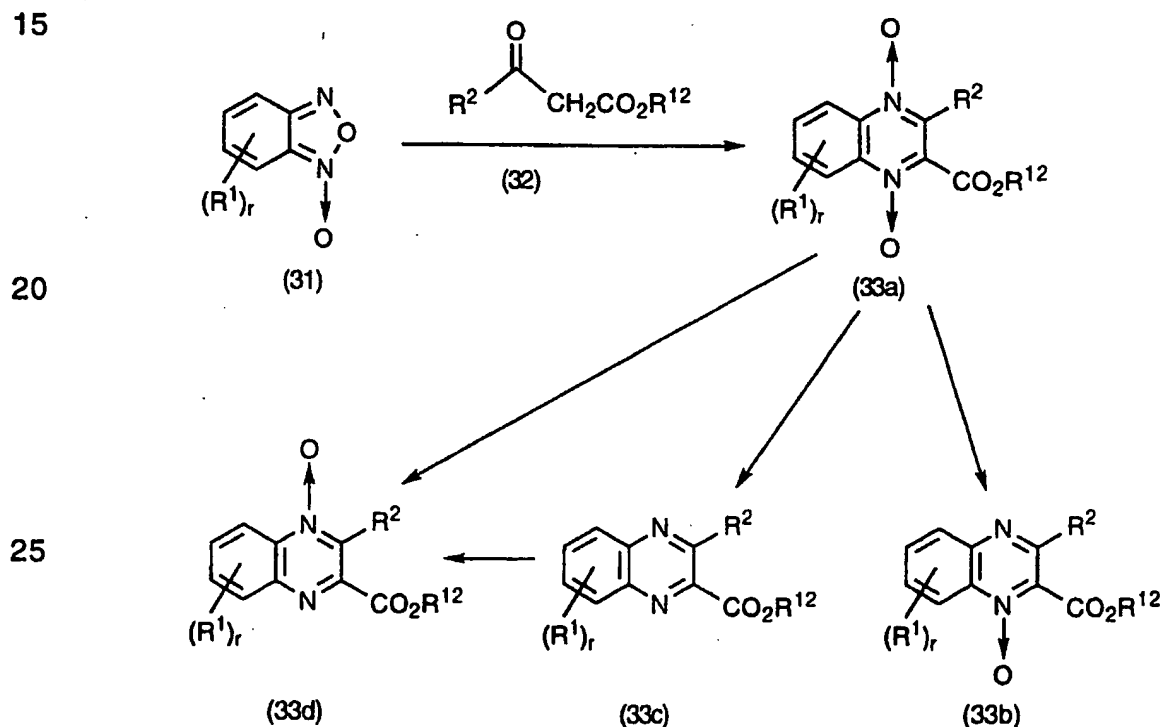
The reaction of the compound (28) and the compound (29) is carried out under the same conditions as those of the reaction of the compound (1a) and the compound (4a) in the above Reaction Scheme-2.

5 The reaction of converting the compound (30) into the compound (3d) is carried out under the same conditions as those of the reaction of converting the compound (17) into the compound (3a) in the above Reaction Scheme-15, when R^{34} of the compound (30) is a group of the formula:



10 When R^{34} of the compound (30) is a group of the formula: $-NR^{36}R^{37}$, the reaction of converting the compound (30) into the compound (3d) is carried out under the same conditions as those of the reduction of the compound (1o) into the compound (1m) in the above Reaction Scheme-6 wherein R^{14} is a phenyl-lower alkoxy group.

Reaction Scheme-20



- 231 -

[wherein R¹, R², R¹² and r are the same as defined above]

The reaction of the compound (31) and the compound (32) is carried out in the presence of a basic compound. The basic compound includes the same basic compounds as used for the reaction of the compound (1a) and the compound (4a) in the above Reaction Scheme-2. The compound (32) is used at least in equimolar amount, preferably in an amount of 1 to 5 moles, to 1 mole of the compound (31). The reaction is carried out at a temperature of 0 to 100°C, preferably at a temperature of 0 to about 70°C, for 1 hour to about 5 day.

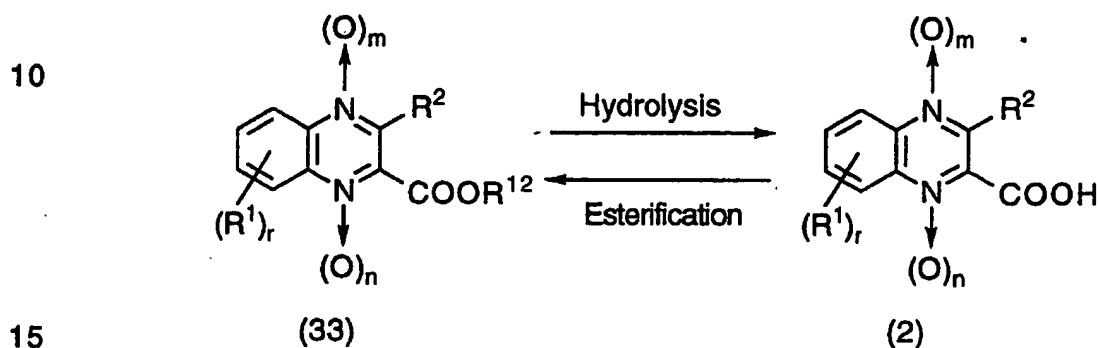
The reaction of converting the compound (33a) into the compound (33b) is carried out in the presence of a halogenated phosphorus compound such as phosphorus tribromide, phosphorus trichloride, etc. in a suitable solvent. The solvent includes, for example, ethers (e.g. dioxane, tetrahydrofuran, etc.), halogenated hydrocarbons (e.g. chloroform, methylene chloride, carbon tetrachloride, etc.), and the like. The halogenated phosphorus compound is used in an amount of 1 to 2 moles, to 1 mole of the compound (33a). The reaction is usually carried out at a temperature of 0 to 100°C, preferably at a temperature of 0 to about 70°C, for 0.5 to 5 hours.

The reaction of converting the compound (33a) into the compound (33c) is carried out by reacting the compound (33a) with sodium hydrosulfate in the presence of an acid in a suitable solvent. The solvent includes, for example, alcohols (e.g. methanol, ethanol, propanol, butanol, 3-methoxy-1-butanol, ethylcellosolve, methylcellosolve, etc.), water, and the like. The acid includes, for example, mineral acids such as hydrochloric acid, etc. Sodium hydrosulfate is used at least in equimolar amount, preferably in an amount of 1 to 5 moles, to 1 mole of the compound (33a). The reaction is usually carried out at a temperature of 0 to 100°C, preferably at a temperature of 0 to about 70°C, for 1 to about 10 hours.

The reaction of converting the compound (33c) into the compound (33d) is carried out under the same conditions as those of the reaction of converting the compound (1c) into the compound (1d) in the above Reaction Scheme-3.

- 232 -

The reaction of converting the compound (33a) into the compound (33d) is carried out under the same conditions as those of the above mentioned reaction of converting the compound (33a) into the compound (33d) except a trialkylphosphite such as trimethylphosphite is used instead of a halogenated phosphorus compound, and the solvent used therein may be an alcohol such as 1-propanol, etc., and the reaction is carried out at a temperature of 0 to 150°C, preferably at a temperature of 0 to 100°C.

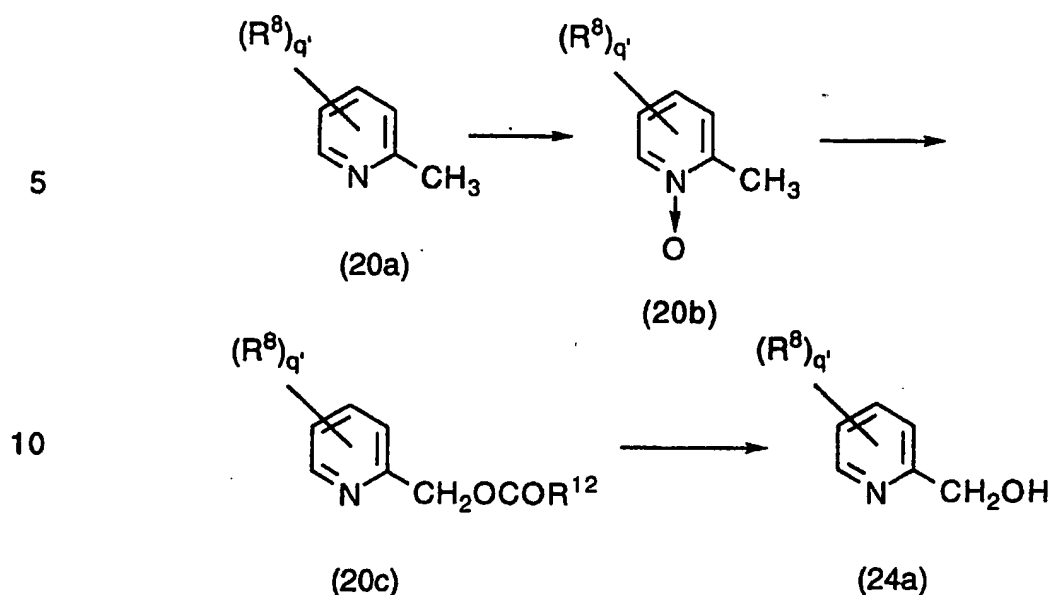
Reaction Scheme-21

[wherein R^1 , R^2 , R^{12} , r , m and n are the same as defined above]

The hydrolysis of the compound (33) is carried out under the same conditions as those of the hydrolysis of the compound (1j) in the above Reaction Scheme-5.

20 The esterification of the compound (2) is carried out by reacting the starting compound with an alcohol (e.g. methanol, ethanol, isopropanol, etc.) in the presence of an inorganic acid (e.g. hydrochloric acid, sulfuric acid, etc.) and a halogenating agent such as thionyl chloride, phosphorus oxychloride, phosphorus pentachloride, phosphorus trichloride, etc., at a temperature of 0 to 150°C, preferably at a temperature of 50 to 100°C, for 5 minutes to about 10 hours.

The intermediate compound (24a) is prepared by the following Reaction Scheme-22.

Reaction Scheme-22

[wherein R^8 , q' and R^{12} are the same as defined above]

15 The reaction of converting the compound (20a) into the compound (20b) is carried out in the presence of an oxidizing agent in a suitable solvent. The solvent and the oxidizing agent used therein are the same solvents and oxidizing agents as used for the reaction of the converting the compound (1c) into the compound (1d) in the above Reaction Scheme-3, respectively. The oxidizing agent is usually used in an excess amount to the compound (20a). The reaction is usually carried out at a temperature of room temperature to 150°C, preferably at a temperature of room temperature to about 120°C, for 1 to about 20 hours.

25 The reaction of converting the compound (20b) into the compound (20c) is carried out by heating the compound (20b) in the presence of a compound of the formula: $R^{12}COOCOR^{12}$ (R^{12} is the same as defined above) at a temperature of room temperature to about 200°C, preferably at a temperature of room temperature to 150°C, for 1 to 10 hours.

30 The reaction of converting the compound (20c) into the compound (24a) is carried out under the same conditions as those of the hydrolysis of the compound (1j) in the above Reaction Scheme-5.

The compound (1) wherein R^5 or R^8 is an amino group is

- 234 -

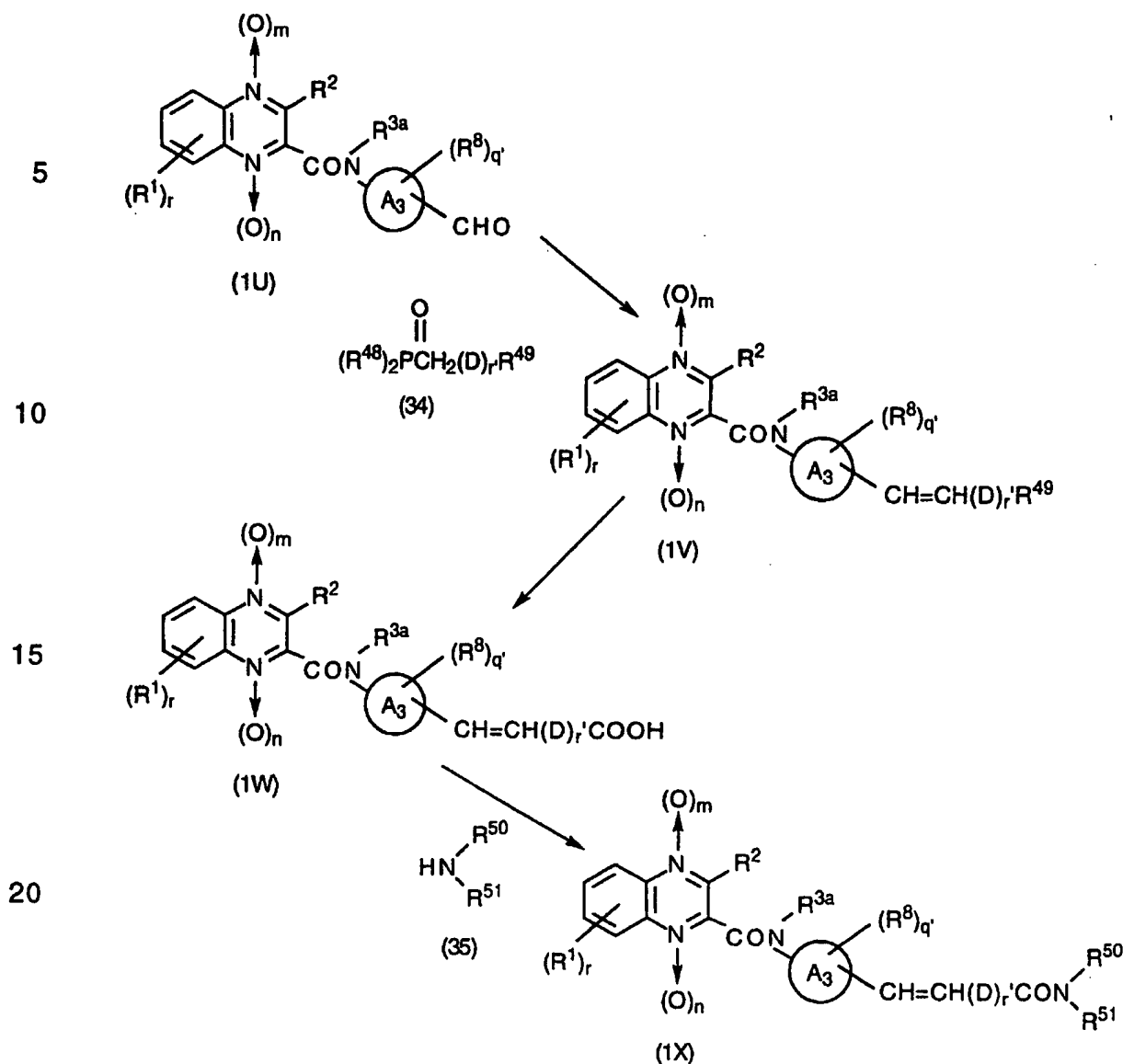
prepared by reducing the corresponding compound (1) wherein R⁵ or R⁸ is nitro group.

5 The reduction reaction is carried out, for example, (a) by using a catalyst in a suitable solvent, or (b) by using as a reducing agent a mixture of a metal or a metal salt with an acid, a mixture of a metal or a metal salt and an alkali metal hydroxide, an alkali metal sulfite or an alkali metal ammonium salt in an inert solvent.

10 When the above (a) is employed, the solvent includes, for example, water, acetic acid, alcohols (e.g. methanol, ethanol, isopropanol, etc.), hydrocarbons (e.g. hexane, cyclohexane, etc.), ethers (e.g. dioxane, tetrahydrofuran, diethyl ether, diethylene glycol dimethyl ether, etc.), esters (e.g. ethyl acetate, methyl acetate, etc.), aprotic polar solvents (e.g. N,N - dimethylformamide, etc.), or a mixture of these solvents. The catalyst includes, for example, palladium, palladium-black, palladium-carbon, platinum, platinum
15 oxide, copper chromite, Raney-nickel, and the like. The catalyst is used in an amount of 0.02 to 1 mole, to 1 mole of the starting compound. The reaction is carried out at a temperature of -20 to 150°C, preferably, at a temperature of 0 to 100°C, under 1 to 10 atms of hydrogen gas, for 0.5 to 10 hours. An acid (e.g. hydrochloric acid) may be added to the reaction system.

20 When the method (b) is employed, there is used as a reducing agent a mixture of iron, zinc, tin or stannous chloride and a mineral acid (e.g. hydrochloric acid, sulfuric acid, etc.), or a mixture of iron, iron sulfide, zinc or tin and an alkali metal hydroxide (e.g. sodium hydroxide, etc.), sulfide (e.g. ammonium sulfide, etc.), aqueous ammonia, ammonium salt (e.g. ammonium
25 chloride, etc.). The inert solvent includes, for example, water, methanol, ethanol, dioxane, acetic acid, and the like. The conditions for reduction can be selected according to the kinds of the reducing agent to be used. For example, when a mixture of stannous chloride and hydrochloric acid is used as a reducing agent, the reaction is preferably carried out at a temperature from 0°C
30 to about room temperature, for 0.5 to about 10 hours. The reducing agent may be used at least in equimolar amount, usually in an amount of 1 mole to 5 moles, to 1 mole of the starting compound.

- 235 -

Reaction Scheme-23

25 [wherein R^1 , R^2 , R^{3a} , R^8 , R^{39} , m , n , q' , D , r , r' and the group of the formula:

— A_3 — are the same as defined above, R^{48} is a lower alkoxy group, R^{49} is a lower alkoxycarbonyl group, and R^{50} and R^{51} are the same or different and each hydrogen atom or a lower alkyl group]

30 The reaction of the compound (1U) and the compound (34) is carried out in the presence of a basic compound in a suitable solvent. The basic compound includes, for example, inorganic bases (e.g. metal sodium,

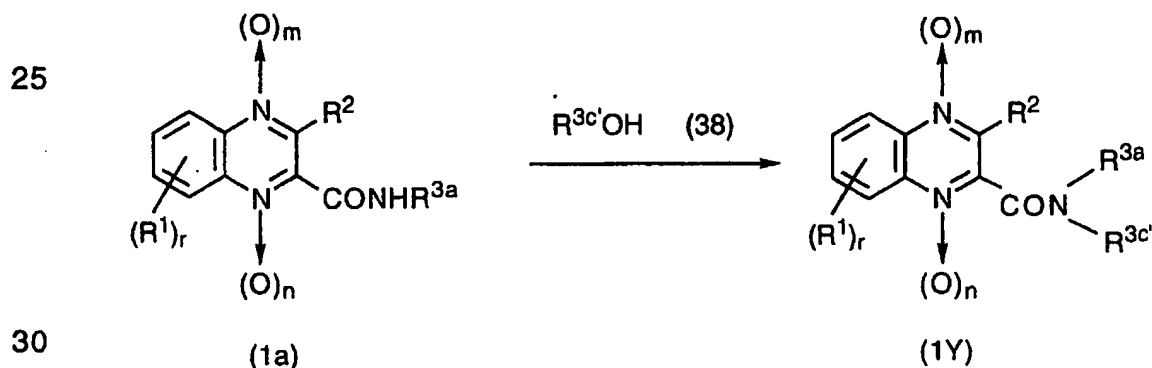
- 236 -

metal potassium, sodium hydride, sodium amide, sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, sodium hydrogen carbonate, etc.), organic bases such as an alkali metal alcoholate (e.g. sodium methylate, sodium ethylate, potassium t-butoxide, etc.), an alkyl lithium, aryl lithium or lithium amide (e.g. methyl lithium, n-butyl lithium, phenyl lithium, lithium diisopropylamide, etc.), pyridine, piperidine, quinoline, triethylamine, N,N-dimethylaniline, and the like. The solvent may be any one which does not affect the reaction, and includes, for example, ethers (e.g. diethyl ether, dioxane, tetrahydrofuran, monoglyme, diglyme, etc.), aromatic hydrocarbons (e.g. benzene, toluene, xylene, etc.), aliphatic hydrocarbons (e.g. n-hexane, heptane, cyclohexane, etc.), amines (e.g. pyridine, N,N-dimethylaniline, etc.), aprotic polar solvents (e.g. N,N-dimethylformamide, dimethyl sulfoxide, hexamethylphosphoric triamide, etc.), alcohols (e.g. methanol, ethanol, isopropanol, etc.), and the like. The reaction is usually carried out at a temperature from -80°C to 150°C, preferably at a temperature from -80 to about 120°C, for 0.5 to about 15 hours.

The reaction of converting the compound (1V) into the compound (1W) can be carried out under the same conditions as those of the hydrolysis of the compound (1j) in the above Reaction Scheme-5.

The reaction of the compound (1W) and the compound (35) can be carried out under the same conditions as those of the reaction of the compound (2) and the compound (3) in the above Reaction Scheme-1.

Reaction Scheme-24



[wherein R¹, R², m, n, r and R^{3a} are the same as defined above, R^{3c'} is a phenyl - lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy carbonyl

- 237 -

group, a phenoxycarbonyl group, or a group of the formula: $-\text{CO}-\text{A}-\text{NR}^{52}\text{R}^{53}$ (in which A, R^{52} , R^{53} are the same as defined above)]

The reaction of the compound (1a) and the compound (38) is carried out under the same conditions as those of the reaction of the compound (2) and the compound (3) in Reaction Scheme-1. In said reaction, when the compound (38) is used in the form of an acid anhydride, the reaction of the carboxylic acid anhydride and the amine compound is carried out in the same manner as in the reaction of the compound (2) and the compound (3) when the active ester method is employed, i.e. in the presence of a basic compound in a solvent at a temperature of 0 to 150°C, preferably at a temperature of 10 to 100°C, for 5 to 30 hours. The carboxylic acid anhydride compound is used at least in equimolar amount, preferably in an amount of 1 to 2 moles, to 1 mole of the compound (1a).

The compound (1) wherein R^8 is a lower alkanoyl group is prepared by reacting the corresponding compound (1) wherein R^8 is cyano group with a compound of the formula: R^{17}MgX (11) (wherein R^{17} and X are the same as defined above), followed by subjecting the resultant to hydrolysis. The reaction of the compound (1) and the compound (11) is carried out under the same conditions as those of the reaction of the compound (1s) and the compound (11) in the above Reaction Scheme-8. The subsequent hydrolysis is carried out under the same conditions as those of the hydrolysis of the compound (1j) in the above Reaction Scheme-5. The reaction is preferably carried out in the presence of an acid.

The compound (1) wherein R^5 is a 1,3-dioxolanyl group having optionally a lower alkyl substituent or R^8 is a 1,3-dioxolanyl-substituted lower alkyl group having optionally a lower alkyl substituent is prepared by reacting the corresponding compound (1) wherein R^5 is a lower alkanoyl group or R^8 is a lower alkanoyl-substituted lower alkyl group with a compound of the formula:



- 238 -

(wherein R^{38} is a lower alkyl group, v is 0 or an integer of 1 to 3). The reaction is carried out in the presence of an acid in a suitable solvent. The solvent includes, for example, in addition to the same solvents for the above mentioned reaction of the compound (1a) and the compound (4a) in the above mentioned

5 Reaction Scheme-2, halogenated hydrocarbons (e.g. methylene chloride, dichloroethane, chloroform, etc.). The acid includes, for example, mineral acids (e.g. hydrochloric acid, sulfuric acid, hydrobromic acid, etc.), organic acids (e.g. p-toluenesulfonic acid, etc.), and the like. The compound (36) is used at least

10 in equimolar amount, preferably in an amount of 1 to 10 mole, to 1 mole of the starting compound. The reaction is usually carried out at a temperature of room temperature to 150°C, preferably at a temperature of room temperature to about 100°C, for 1 to about 24 hours.

The compound (1) wherein R^5 is a lower alkanoyl group or R^8 is a lower alkanoyl-substituted lower alkyl group is prepared by hydrolysis of the

15 corresponding compound (1) wherein R^5 is a 1,3-dioxolanyl group having optionally a lower alkyl substituent, or R^8 is a 1,3-dioxolanyl-substituted lower alkyl group having optionally a lower alkyl substituent. The hydrolysis is carried out in the presence of an acid in a suitable solvent. The solvent includes, for example, water, lower alcohols (e.g. methanol, ethanol,

20 isopropanol, etc.), ketones (e.g. acetone, methyl ethyl ketone, etc.), halogenated hydrocarbons (e.g. dichloromethane, dichloroethane, chloroform, carbon tetrachloride, etc.), or a mixture of these solvents. The acid includes, for example, inorganic acids (e.g. hydrochloric acid, sulfuric acid, hydrobromic acid, etc.) and organic acids (e.g. p-toluenesulfonic acid, etc.). The reaction is

25 carried out at a temperature of 0 to 70°C, preferably at a temperature of 0°C to room temperature, for 1 to 10 about hours.

The compound (1) wherein R^8 is a tetrazolyl group having a substituent selected from a lower alkyl group and a lower alkoxy-lower alkyl group is prepared by reacting the corresponding compound (1) wherein R^8 is a

30 tetrazolyl group with a compound of the formula: $R^{39}X$ (37) (wherein R^{39} is a lower alkyl group or a lower alkoxy-lower alkyl group, and X is the same as defined above) in the same manner as in the reaction of the compound (10)

- 239 -

with the compound (4a) in the above mentioned Reaction Scheme-2.

The compound (1) wherein R⁸ is unsubstituted tetrazolyl group is prepared by subjecting the compound (1) wherein R⁸ is a tetrazolyl group having a lower alkoxy-lower alkyl substituent, to hydrolysis in the same manner as in the hydrolysis of the compound (1o) wherein R¹⁴ is a lower alkoxy - substituted lower alkoxy group in the above mentioned Reaction Scheme-6.

The compound (1) wherein R² is a morpholino-substituted lower alkyl group or an imidazolyl-substituted lower alkyl group is prepared by reacting the corresponding compound (1) wherein R² is a lower alkyl group having a halogen substituent with morpholine or imidazole in the same manner as in the reaction of the compound (1a) and the compound (4a) in the above mentioned Reaction Scheme-2.

The compound (1) wherein R² is a halogen-substituted methyl group is prepared by reacting the corresponding compound (1) wherein R² is methyl group in the same manner as in the reaction of converting the compound (20) into the compound (21) in the above mentioned Reaction Scheme-17. Further, the compound (1) wherein R² is a halogen-substituted methyl group (in which halogen atom is fluorine atom) is also prepared by reacting the corresponding compound (1) wherein R² is a halogen-substituted methyl group (in which halogen atom is other than fluorine atom) with silver fluoride.

Among the desired compounds (1) of the present invention, the compounds having a basic group can easily be converted into acid addition salts thereof by treating them with a pharmaceutically acceptable acid. The acid includes, for example, inorganic acids (e.g. hydrochloric acid, sulfuric acid, phosphoric acid, hydrobromic acid, etc.), and organic acids (e.g. oxalic acid, acetic acid, succinic acid, malonic acid, methanesulfonic acid, maleic acid, fumaric acid, malic acid, tartaric acid, citric acid, benzoic acid, etc.). These salts show as well excellent antidiabetic activity as the free compounds (1).

Besides, among the desired compounds (1) of the present invention, the compounds having an acidic group can easily be converted into

- 240 -

salts by treating them with a pharmaceutically acceptable basic compound. The basic compound includes, for example, sodium hydroxide, potassium hydroxide, calcium hydroxide, sodium carbonate, potassium hydrogen carbonate, and the like.

5 The desired compound of each process can easily be isolated and purified by conventional isolation methods. The isolation methods are, for example, extraction with solvent, dilution method, recrystallization method, column chromatography, preparative thin layer chromatography, and the like.

10 In addition, the compounds (1) of the present invention include stereoisomers and optical isomers, and these isomers are also useful as antidiabetic agents.

 The desired compounds (1) of the present invention and salts thereof are useful as antidiabetic agent and are used in the form of a conventional pharmaceutical preparation. The preparation is prepared by
15 using conventional diluents or carriers such as fillers, thickening agents, binders, wetting agent, disintegrators, surfactants, lubricants, and the like. The pharmaceutical preparations can be selected from various forms in accordance with the desired utilities, and the representative forms are tablets, pills, powders, solutions, suspensions, emulsions, granules, capsules,
20 suppositories, injections (solutions, suspensions, etc.), and the like. In order to form in tablets, there are used carriers such as vehicles (e.g. lactose, white sugar, sodium chloride, glucose, urea, starch, calcium carbonate, kaolin, crystalline cellulose, silicic acid, etc.), binders (e.g. water, ethanol, propanol, simple syrup, glucose solution, starch solution, gelatin solution, carboxymethyl
25 cellulose, shellac, methyl cellulose, potassium phosphate, polyvinyl - pyrrolidone, etc.), disintegrators (e.g. dry starch, sodium alginate, agar powder, laminaran powder, sodium hydrogen carbonate, calcium carbonate, polyoxyethylene sorbitan fatty acid esters, sodium laurylsulfate, stearic monoglyceride, starches, lactose, etc.), disintegration inhibitors (e.g. white
30 sugar, stearin, cacao butter, hydrogenated oils, etc.), absorption promoters (e.g. quaternary ammonium base, sodium laurylsulfate, etc.), wetting agents (e.g. glycerin, starches, etc.), adsorbents (e.g. starches, lactose, kaolin, bentonite, colloidal silicates, etc.), lubricants (e.g. purified talc, stearates, boric acid

- 241 -

powder, polyethylene glycol, etc.), and the like. Moreover, the tablets may also be in the form of a conventional coated tablet, such as sugar-coated tablets, gelatin-coated tablets, enteric coated tablets, film coating tablets, or double or multiple layer tablets. In the preparation of pills, the carriers may be

5 conventional ones, and include, for example, vehicles (e.g. glucose, lactose, starches, cacao butter, hydrogenated vegetable oils, kaolin, talc, etc.), binders (e.g. gum arabic powder, tragacanth powder, gelatin, ethanol, etc.), disintegrators (e.g. laminaran, agar, etc.), and the like. In the preparation of suppositories, the carriers may be conventional ones, and include, for

10 example, polyethylene glycol, cacao butter, higher alcohols, higher alcohol esters, gelatin, semi-synthetic glycerides, and the like. Capsules can be prepared by charging a mixture of the compound of the present invention and the above carriers into hard gelatin capsules or soft capsules in usual manner. In the preparation of injections, the solutions, emulsions and suspensions are

15 sterilized and are preferably made isotonic with the blood. In the preparation of these solutions, emulsions and suspensions, there are used conventional diluents, such as water, ethyl alcohol, macrogol, propylene glycol, ethoxylated isostearyl alcohol, polyoxylated isostearyl alcohol, polyoxyethylene sorbitan fatty acid esters, and the like. In this case, the pharmaceutical preparations

20 may also be incorporated with sodium chloride, glucose, or glycerin in an amount sufficient to make them isotonic, and may also be incorporated with conventional solubilizers, buffers, anesthetizing agents. Besides, the pharmaceutical preparations may optionally be incorporated with coloring agent, preservatives, perfumes, flavors, sweetening agents, and other

25 medicaments, if required.

The amount of the desired compound of the present invention to be incorporated into the pharmaceutical preparation is not specified but may be selected from a broad range, but usually, it is preferably in the range of 1 to 70 % by weight.

30 The pharmaceutical preparation of the present invention containing as an active ingredient the compounds (1) of the present invention or a salt thereof may be administered in any method, and suitable method for administration may be determined in accordance with various forms of

- 242 -

preparations, ages, sexes and other conditions of the patients, the degree of severity of diseases, and the like. For example, tablets, pills, solutions, suspensions, emulsions, granules and capsules are administered orally. The injections are intravenously administered alone or together with a conventional
5 auxillary liquid (e.g. glucose, amino acid solutions), and further are optionally administered alone in intramuscular, intracutaneous, subcutaneous, or intraperitoneal route, if required. Suppositories are administered in intrarectal route.

10 The dosage of the pharmaceutical preparation of the present invention may be selected in accordance with the usage, ages, sexes and other conditions of the patients, the degree of severity of the diseases, and the like, but it is usually in the range of about 0.2 to 200 mg of the active compound of the present invention per 1 kg of body weight of the patient per day.

- 243 -

Best Mode for Carrying Out the InventionExamples

The present invention is illustrated in more detail by the following Preparations of antidiabetic agent, Reference Examples of processes for preparing the starting compounds to be used for preparing the desired compounds of the present invention, and Examples of processes for preparing the desired compounds, and Experiments of the activities of the desired compounds of the present invention.

Preparation 1

Tablets are prepared from the following components.

<u>Components</u>	<u>Amount</u>
2-(2-Benzofuranylmethylaminocarbonyl)- 3-methylquinoxalin-4-oxide	5 mg
Starch	132 mg
Magnesium stearate	18 mg
Lactose	45 mg
Totally	200 mg

In the conventional manner, these are obtained tablets each containing the above components.

Preparation 2

Film coated tablets are prepared from the following components.

<u>Components</u>	<u>Amount</u>
2-[3-(4-Methoxyphenyl)propylaminocarbonyl]- 3-methylquinoxalin-4-oxide	150 mg
Avicel (trade name of microcrystalline cellulose manufactured by Asahi Chemical Industry, Co., Ltd. Japan)	40 g
Corn starch	30 g
Magnesium stearate	2 g
Hydroxypropyl methylcellulose	10 g
Polyethylene glycol-6000	3 g
Castor oil	40 g
Methanol	40 g

The active compound of the present invention, Avicel, corn starch and magnesium stearate are mixed and kneaded and the mixture is tabletted

- 244 -

using a conventional pounder (R 10 mm) for sugar coating. The tablets thus obtained are coated with a film coating agent consisting of hydroxypropyl methylcellulose, polyethylene glycol-6000, castor oil and methanol to give film coated tablets.

5

Reference Example 1

A solution of 2-ethoxycarbonyl-3-methylbenzofuran (5.0 g) in anhydrous diethyl ether (10 ml) is added dropwise to a suspension of lithium aluminum hydride (0.93 g) in diethyl ether (30 ml) under ice-cooling, and the mixture is stirred at room temperature for 30 minutes. The mixture is cooled, and decomposed with saturated aqueous sodium sulfate solution. The mixture is filtered through celite, and dried over anhydrous sodium sulfate, and the residue is evaporated to remove the solvent to give 2-hydroxymethyl-3-methylbenzofuran (3.7 g) as white powder.

¹H-NMR (CDCl₃) δ ppm: 1.82 (1H, t, J=6 Hz), 2.27 (3H, s), 4.76 (2H, d, J=6 Hz), 7.20-7.55 (4H, m)

Reference Example 2

In tetrahydrofuran (40 ml) are suspended 2-hydroxymethyl-3-methylbenzofuran (3.7 g), triphenylphosphine (6.6 g) and phthalimide (3.7 g), and thereto is added dropwise a solution of diethyl azodicarboxylate (4.4 g) in tetrahydrofuran (10 ml) under ice-cooling. The mixture is stirred at room temperature overnight, and evaporated to remove the solvent, and the resulting residue is purified by silica gel column chromatography (solvent; methylene chloride), and crystallized from diethyl ether. The crystals are collected by filtration, and dried to give 3-methyl-2-phthalimidomethylbenzofuran (4.6 g) as white powder.

¹H-NMR (CDCl₃) δ ppm: 2.40 (3H, s), 4.97 (2H, s), 7.10-7.30 (2H, m), 7.40 (1H, d, J=7 Hz), 7.48 (1H, d, J=7 Hz), 7.65-7.75 (2H, m), 7.80-7.90 (2H, m)

Reference Example 3

To methanol (80 ml) is added 3-methyl-2-phthalimidomethylbenzofuran (4.6 g), and thereto is added hydrazine hydrate (1.2 g), and the mixture is refluxed for three hours. The mixture is evaporated to remove the solvent, and to the residue is added diluted aqueous sodium hydroxide solution, and then the mixture is extracted with chloroform. The chloroform

- 245 -

layer is washed with saturated brine solution, and dried over anhydrous sodium sulfate. The residue is evaporated to remove the solvent to give 2 - aminomethyl-3-methylbenzofuran (3.0 g) as colorless transparent liquid.

¹H-NMR (CDCl₃) δ ppm: 1.55 (2H, brs), 2.21 (3H, s), 3.93 (2H, s), 7.15 - 7.30 (2H, m), 7.35-7.50 (2H, m)

Reference Example 4

To carbon tetrachloride (50 ml) are added 2-methylbenzo - thiophene (4.0 g), N-bromosuccinimide (4.8 g) and azobisisobutyronitrile (0.3 g), and the mixture is refluxed for five hours. After cooling, the insoluble materials are removed by filtration, and the filtrate is concentrated to give 2 - bromomethylbenzothiophene (6.7 g) as brown powder.

¹H-NMR (CDCl₃) δ ppm: 4.79 (2H, s), 7.30-7.45 (2H, m), 7.36 (1H, s), 7.70-7.85 (2H, m)

Reference Example 5

In dimethylformamide (40 ml) is dissolved 2-bromomethyl - benzothiophene (6.7 g), and thereto is added potassium phthalimide (5.0 g), and the mixture is stirred at 60°C for two hours. The mixture is evaporated to remove the dimethylformamide, and the residue is extracted with chloroform. The extract is washed with water and saturated brine solution, dried over anhydrous sodium sulfate, and evaporated to remove the solvent. To the residue is added diethyl ether, and the precipitated crystals are collected by filtration, and dried to give 2-phthalimidomethylbenzothiophene (4.5 g) as pale brown powder.

¹H-NMR (CDCl₃) δ ppm: 5.10 (2H, s), 7.20-7.40 (3H, m), 7.70-7.80 (4H, m), 7.80-7.95 (2H, m)

Reference Example 6

3-Formylbenzofuran (4.3 g) is dissolved in methanol (50 ml), and thereto is added gradually sodium borohydride (1.1 g) under ice-cooling. The mixture is stirred at the same temperature for one hour, and evaporated to remove the methanol. The residue is extracted with chloroform, and the extract is washed with water, and dried over anhydrous sodium sulfate. The residue is evaporated to remove the solvent to give 3-hydroxymethylbenzofuran (4.1 g) as

- 246 -

pale yellow liquid.

$^1\text{H-NMR}$ (CDCl_3) δ ppm: 1.62 (1H, t, $J=5$ Hz), 4.85 (2H, d, $J=5$ Hz), 7.20 - 7.45 (2H, m), 7.53 (1H, d, $J=8$ Hz), 7.62 (1H, s), 7.68 (1H, d, $J=8$ Hz)

Reference Example 7

5 A solution of ethyl 2-benzofuranacrylate (3.46 g) in dry toluene is cooled to -50°C , and thereto is added dropwise aluminum diisobutyl hydride (1M toluene solution, 37 ml). The mixture is stirred at -20°C for one hour, and thereto is added methanol (30 ml), and the mixture is stirred at room temperature overnight. The precipitates are removed by filtration, and the
10 filtrate is concentrated. The residue is dissolved in ethyl acetate, and filtered through Florisil (an activated magnesium silicate), and concentrated to give 2 - (3-hydroxy-1-propenyl)benzofuran (2.6 g) as colorless liquid.

$^1\text{H-NMR}$ (CDCl_3) δ ppm: 4.39 (2H, brs), 6.60 (3H, m), 7.17-7.32 (2H, m), 7.43 (1H, d, $J=7$ Hz), 7.52 (1H, d, $J=7$ Hz)

15 Reference Example 8

Into a mixture of benzothiophene (13.4 g) and 37 % aqueous formaldehyde solution (15 ml) is blown hydrogen chloride gas for about 20 to 30 minutes under ice-cooling. The mixture is stirred at room temperature for two hours. The reaction mixture is poured into ice-water, and extracted with
20 diethyl ether. The extract is washed with saturated sodium hydrogen carbonate solution, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent. and the resulting residue and potassium phthalimide (18.5 g) are dissolved in dimethylformamide (100 ml). The mixture is heated at 60°C for 1.5 hour, and after cooling, the mixture is poured into ice-water. The
25 precipitated crystals are collected by filtration, washed with diisopropyl ether to give 3-phthalimidomethylbenzothiophene (13.4 g) as pale brown crystals.

$^1\text{H-NMR}$ (CDCl_3) δ ppm: 5.08 (2H, s), 7.3-7.5 (2H, m), 7.61 (1H, s), 7.6 - 7.9 (5H, m), 8.15 (1H, d, $J=8$ Hz)

Reference Example 9

30 2-Acetylbenzofuran (3.2 g) is dissolved in methanol (60 ml), and thereto are added ammonium acetate (15 g) and sodium cyanoborohydride (1.26 g). The mixture is stirred at room temperature overnight, and thereto is

- 247 -

added diluted aqueous hydrochloric acid solution to make the solution acidic. The mixture is washed with ethyl acetate, and the aqueous layer is basified with aqueous sodium hydroxide solution, and extracted with chloroform. The chloroform layer is washed with water, dried over anhydrous sodium sulfate, and evaporated to remove chloroform to give 2-(1-aminoethyl)benzofuran (1.8 g) as colorless liquid.

$^1\text{H-NMR}$ (CDCl_3) δ ppm: 1.52 (3H, d, $J=6$ Hz), 1.83 (2H, brs), 4.20 (1H, q, $J=6$ Hz), 6.50 (1H, s), 7.15-7.30 (2H, m), 7.43 (1H, d, $J=8$ Hz), 7.51 (1H, d, $J=8$ Hz)

Reference Example 10

5-Ethyl-2-methylpyridine (25 g) is dissolved in acetic acid (200 ml), and thereto is added 30 % aqueous hydrogen peroxide solution (25 ml), and the mixture is heated at 100°C . Four hours later, to the mixture is added 30 % aqueous hydrogen peroxide solution (25 ml), and the mixture is heated with stirring at the same temperature for 14 hours. After cooling, the mixture is concentrated several times with adding water thereto. The final residue is neutralized with saturated aqueous potassium carbonate solution, and extracted with chloroform. The extract is dried over anhydrous potassium carbonate, and evaporated to remove the solvent. The resulting residue is dissolved in acetic anhydride (200 ml), and the mixture is heated at 120°C for 4 hours. The mixture is evaporated to remove the solvent, and thereto is added saturated aqueous sodium hydrogen carbonate solution, and extracted with ethyl acetate. The extract is dried over anhydrous sodium sulfate, and evaporated to remove the solvent. The residue is dissolved in methanol (200 ml), and thereto is added potassium carbonate (57 g), and the mixture is stirred at room temperature for 12 hours. The mixture is evaporated to remove the solvent, and thereto is added water. The mixture is extracted with chloroform, and dried over anhydrous potassium carbonate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; ethyl acetate : n-hexane=1 : 4) to give 5-ethyl-2-hydromethylpyridine (20.4 g) as pale brown liquid.

$^1\text{H-NMR}$ (CDCl_3) δ ppm: 1.26 (3H, t, $J=8$ Hz), 2.66 (2H, q, $J=8$ Hz), 3.67 (1H, br), 4.73 (2H, s), 7.18 (1H, d, $J=8$ Hz), 7.52 (1H, d, $J=8$ Hz), 8.41 (1H, s)

- 248 -

Reference Example 11

4-(2-Methyl-1,3-dioxolan-2-yl)benzonitrile (1.9 g) is dissolved in diethyl ether (20 ml), and thereto is added lithium aluminum hydride (400 mg) at 0°C. The mixture is reacted at room temperature for 14 hours, and thereto are added water (1 ml) and 8M aqueous sodium hydroxide solution (3 ml). To the mixture is added magnesium sulfate, and the insoluble materials are removed by filtration. The filtrate is concentrated to give [4-(2-methyl-1,3-dioxolan-2-yl)benzyl]amine (2.1 g) as colorless oil.

¹H-NMR (CDCl₃) δ ppm: 7.45 (2H, d, J=8 Hz), 7.29 (2H, d, J=8 Hz), 4.04 (2H, m), 3.87 (2H, s), 3.77 (2H, m), 1.77 (2H, br), 1.65 (3H, s)

Reference Example 12

N-Bromoethylphthalimide (13 g) and p-methoxythiophenol (7.9 g) are dissolved in dimethylformamide (70 ml), and thereto is added potassium carbonate (10 g). The mixture is stirred at 70°C overnight, and evaporated to remove the solvent. The residue is extracted with diethyl ether, washed with water, and dried over anhydrous sodium sulfate. The residue is evaporated to remove diethyl ether, and crystallized from n-hexane. The crystals are collected by filtration, and dried to give N-[2-(4-methoxyphenylthio)ethyl]phthalimide (13.9 g) as white powder.

¹H-NMR (CDCl₃) δ ppm: 3.14 (2H, t, J=7 Hz), 3.75 (3H, s), 3.89 (2H, t, J=7 Hz), 6.80 (2H, d, J=8 Hz), 7.42 (2H, d, J=8 Hz), 7.65-7.75 (2H, m), 7.75-7.90 (2H, m)

Reference Example 13

N-(2-Chloroethyl)dibenzylamine · hydrochloride (25 g) and phenol (8.0 g) are dissolved in dimethylformamide (100 ml), and thereto is added potassium carbonate (30 g). The mixture is stirred at 70°C for 6 hours, and evaporated to remove dimethylformamide. The residue is extracted with diethyl ether, and the extract is washed with water, and dried over anhydrous sodium sulfate. The residue is evaporated to remove diethyl ether to give N-(2-phenoxyethyl)dibenzylamine (25.5 g) as colorless oil.

¹H-NMR (CDCl₃) δ ppm: 2.90 (2H, t, J=6 Hz), 3.72 (4H, s), 4.03 (2H, t, J=6 Hz), 6.80 (2H, d, J=8 Hz), 6.85-7.00 (1H, m), 7.15-7.45 (12H, m)

- 249 -

Reference Example 14

N-(2-Phenoxyethyl)dibenzylamine (25.5 g) is dissolved in ethanol (500 ml), and thereto is added 10 % palladium-carbon (3.0 g). The mixture is subjected to hydrogenation at 50°C under 1 atm of hydrogen gas. The catalyst is removed by filtration, and the filtrate is evaporated to remove ethanol to give 2-phenoxylethylamine (11.0 g) as colorless oil.

$^1\text{H-NMR}$ (CDCl_3) δ ppm: 1.47 (2H, brs), 3.08 (2H, t, $J=5$ Hz), 4.01 (2H, t, $J=5$ Hz), 6.85-7.00 (3H, m), 7.25-7.35 (2H, m)

Reference Example 15

To triethylamine (1.5 liter) are added benzofuroxane (216 g) and ethyl acetoacetate (207 g), and the mixture is stirred at room temperature for four days. The precipitated crystals are collected by filtration, washed with water, dried, and crystallized from ethyl acetate to give 2-ethoxycarbonyl-3-methylquinoxaline-1,4-dioxide (115 g) as pale yellow needles.

M.p. 137-138°C

Reference Example 16

2-Ethoxycarbonyl-3-methylquinoxaline-1,4-dioxide (77 g) is dissolved in ethanol (3.5 liters) and conc. hydrochloric acid (200 ml), and to the mixture is added dropwise aqueous solution of sodium hydrosulfite (200 g) in water (1 liter) with stirring at room temperature. The mixture is stirred at the same temperature for four hours, and the reaction mixture is neutralized with sodium hydrogen carbonate, and evaporated to remove ethanol. To the residue is added water, and the precipitated crystals are collected by filtration, washed with water, dried, and recrystallized from n-pentane to give 2-ethoxy-carbonyl-3-methylquinoxaline (67 g) as colorless needles.

M.p. 74-75°C

Reference Example 17

2-Ethoxycarbonyl-3-methylquinoxaline (64 g) is dissolved in methylene chloride (700 ml), and thereto is added gradually m-chloro-perbenzoic acid (70 g) under ice-cooling. The mixture is stirred at room temperature overnight, and the reaction solution is washed successively with diluted aqueous sodium thiosulfate solution, saturated sodium hydrogen carbonate solution, and water, and dried over anhydrous sodium sulfate. The

- 250 -

resultant is evaporated to remove the solvent, and to the residue is added n - hexane. The precipitated crystals are collected by filtration, dried, and recrystallized from n-hexane/diethyl ether to give 2-ethoxycarbonyl-3 - methylquinoxalin-4-oxide (45 g) as colorless needles.

5 M.p. 91-93°C

Reference Example 18

2-Ethoxycarbonyl-3-methylquinoxaline-1,4-dioxide (105 g) is dissolved in chloroform (500 ml), and thereto is added dropwise gradually phosphorus tribromide (44 ml) under ice-cooling. The mixture is stirred at room
10 temperature for one hour, and evaporated to remove the solvent. The residue is poured into ice-water, and neutralized with potassium carbonate. The mixture is extracted with chloroform, washed with water, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; n -
15 hexane : ethyl acetate = 2 : 1), and recrystallized from ethyl acetate/n-hexane to give 2-ethoxycarbonyl-3-methylquinoxalin-1-oxide (35 g) as colorless prisms.

M.p. 85-87°C

Reference Example 19

2-Ethoxycarbonyl-3-methylquinoxalin-4-oxide (4.0 g) is
20 suspended in methanol (80 ml) and 5N aqueous sodium hydroxide solution (10 ml), and the mixture is stirred at room temperature for three hours. The mixture is evaporated to remove the solvent, and the residue is dissolved in water. The aqueous layer is washed with ethyl acetate, and acidified with hydrochloric acid. The precipitated crystals are collected by filtration, washed
25 with water, and dried to give 2-carboxy-3-methylquinoxaline-4-oxide (3.2 g) as white powder.

M.p. 143-145°C (decomposed)

Reference Example 20

2-Carboxyquinoxaline (2.0 g) is dissolved in methanol (20 ml),
30 and thereto is added dropwise thionyl chloride (1.3 ml) under ice-cooling. The mixture is refluxed for 15 minutes, and evaporated to remove the solvent. The residue is extracted with chloroform, and the extract is washed with saturated aqueous sodium hydrogen carbonate solution, and dried over anhydrous

- 251 -

sodium sulfate. The residue is evaporated to remove the solvent, and the resulting 2-methoxycarbonylquinoxaline is dissolved in methylene chloride (40 ml). To the mixture is added m-chloroperbenzoic acid (2.9 g) with stirring at room temperature, and the mixture is stirred at room temperature overnight.

5 The reaction solution is washed with diluted aqueous sodium thiosulfate solution and saturated sodium hydrogen carbonate solution, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and to the residue is added n-hexane. The precipitated crystals are collected by filtration, and dried to give 2-methoxycarbonylquinoxalin-4-oxide (2.0 g) as
10 yellow powder.

M.p. 154-155°C

Reference Example 21

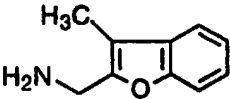
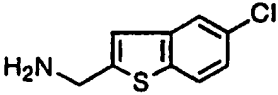
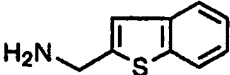

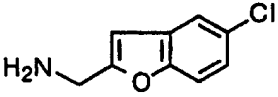
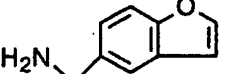
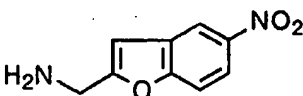
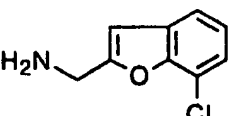
2-Ethoxycarbonyl-3-methylquinoxaline (2.2. g) is dissolved in carbon tetrachloride (40 ml), and thereto are added N-bromosuccinimide (2.7
15 g) and perbenzoic acid (0.2 g), and the mixture is refluxed for 8 hours. The mixture is evaporated to remove the solvent, and thereto is added water. The mixture is extracted with dichloromethane, and the extract is dried over anhydrous sodium sulfate, and evaporated. The residue is dissolved in isopropanol (50 ml), and thereto is added imidazole (2.8 g). The mixture is
20 refluxed for 10 hours, and evaporated to remove the solvent. To the residue is added water, and the mixture is extracted with chloroform, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the resulting residue is purified by silica gel column chromatography (solvent; dichloromethane : methanol = 16 : 1) to give 2-ethoxycarbonyl-3-(1 -
25 imidazolyl)methylquinoxaline (1.33 g) as yellow powder.

¹H-NMR (CDCl₃) δ ppm: 1.47 (3H, t, J=7 Hz), 4.55 (2H, q, J=7 Hz), 5.82 (2H, s), 7.04 (2H, d, J=5 Hz), 7.70 (1H, s), 7.8-8.0 (2H, m), 8.0-8.1 (1H, m), 8.2 - 8.3 (1H, m)

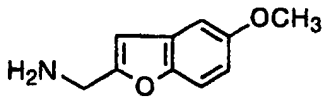
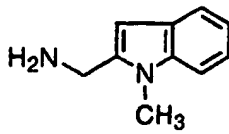
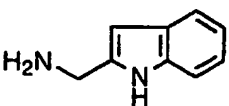
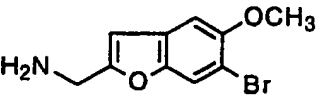
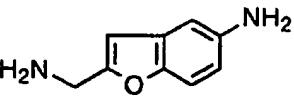
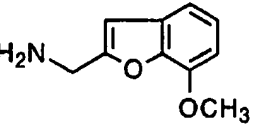
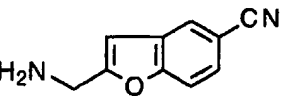
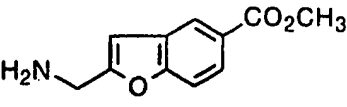
By using the suitable starting compounds, there are obtained the
30 following compounds as listed in Table 1 in the same manner as in Reference Examples 3, 9, 11 and 14.

- 252 -

Table 1

No.	Structure	M.p. °C	Crystalline Form	¹ H-NMR (CDCl ₃) δ ppm:
1			Colorless oil	1.55 (2H, brs), 2.21 (3H, s), 3.93 (2H, s), 7.15-7.30 (2H, m), 7.35-7.50 (2H, m)
2			Yellow powder	1.31 (2H, brs), 4.14 (2H, s), 7.07 (1H, s), 7.2-7.3 (1H, m), 7.6-7.7 (2H, m)
3		65	Yellow powder	1.61 (2H, brs), 4.15 (2H, s), 7.14 (1H, s), 7.25-7.40 (2H, m), 7.72 (1H, d, J=8 Hz), 7.82 (1H, d, J=8 Hz)
4			Pale yellow oil	1.27 (2H, brs), 4.01 (2H, s), 7.20-7.40 (2H, m), 7.50 (1H, d, J=8 Hz), 7.55 (1H, s), 7.60 (1H, d, J=8 Hz)
5			Pale yellow oil	1.56 (2H, brs), 3.97 (2H, s), 6.48 (1H, s), 7.20 (1H, d, J=8 Hz), 7.34 (1H, d, J=8 Hz), 7.48 (1H, s)
6			Pale yellow oil	1.54 (2H, brs), 3.95 (2H, s), 6.74 (1H, d, J=2 Hz), 7.25 (1H, d, J=8 Hz), 7.49 (1H, d, J=8 Hz), 7.54 (1H, s), 7.63 (1H, d, J=2 Hz)
7			Yellow powder	1.58 (2H, brs), 4.04 (2H, s), 6.69 (1H, s), 7.50 (1H, d, J=9 Hz), 8.21 (1H, d, J=9 Hz), 8.46 (1H, s)
8			Pale yellow oil	1.61 (2H, brs), 4.01 (2H, s), 6.58 (1H, s), 7.13 (1H, m), 7.25 (1H, d, J=8 Hz), 7.42 (1H, d, J=8 Hz)

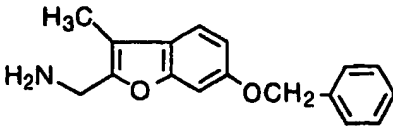
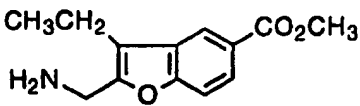
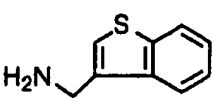
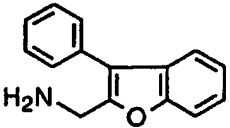
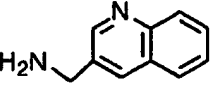
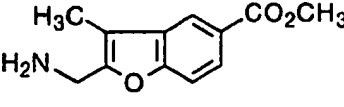
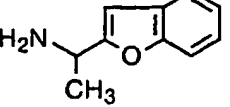
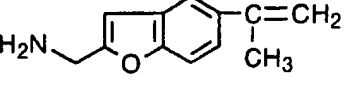
- 253 -

9			Pale yellow oil	1.56 (2H, brs), 3.83 (3H, s), 3.94 (2H, s), 6.46 (1H, s), 6.84 (1H, d, J=8 Hz), 6.98 (1H, s), 7.31 (1H, d, J=8 Hz)
10			Yellow powder	1.49 (2H, brs), 3.75 (3H, s), 4.03 (2H, s), 6.38 (1H, s), 7.04-7.24 (2H, m), 7.30 (1H, d, J=8 Hz), 7.58 (1H, d, J=8 Hz)
11			Yellow powder	1.58 (2H, brs), 4.06 (2H, s), 6.32 (1H, s), 7.03-7.20 (2H, m), 7.34 (2H, d, J=8 Hz), 7.54 (2H, d, J=8 Hz), 8.50 (1H, brs)
12			Pale yellow powder	1.54 (2H, brs), 3.91 (3H, s), 3.94 (2H, s), 6.46 (1H, s), 7.01 (1H, s), 7.63 (1H, s)
13			Yellow powder	1.51 (2H, brs), 3.56 (2H, brs), 3.91 (2H, s), 6.36 (1H, s), 6.62 (1H, d, J=8 Hz), 6.79 (1H, s), 7.22 (1H, d, J=8 Hz)
14			Pale yellow oil	1.57 (2H, brs), 3.98 (2H, s), 4.01 (3H, s), 6.52 (1H, s), 6.74-6.83 (1H, m), 7.08-7.18 (2H, m)
15			Pale yellow powder	4.02 (2H, s), 6.61 (1H, s), 7.52 (2H, brs), 7.86 (1H, brs)
16			Yellow powder	3.94 (3H, s), 4.00 (2H, s), 6.60 (1H, s), 7.45 (1H, d, J=9 Hz), 7.98 (1H, d, J=9 Hz), 8.26 (1H, s)

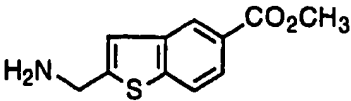
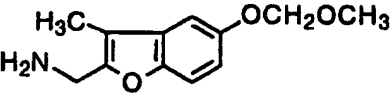
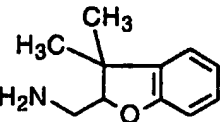
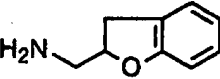
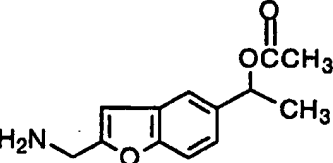
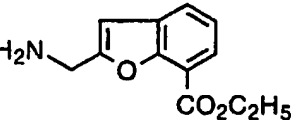
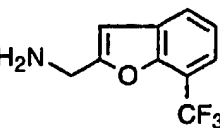
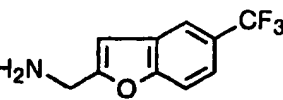
- 254 -

17			Pale yellow oil	1.56 (2H, brs), 2.93 (6H, s), 3.93 (2H, s), 6.42 (1H, s), 6.80 (1H, d, J=8 Hz), 6.85 (1H, s), 7.34 (1H, d, J=8 Hz)
18			Pale yellow oil	1.42 (3H, t, J=7 Hz), 1.53 (2H, brs), 4.00 (2H, s), 4.40 (2H, q, J=7 Hz), 6.60 (1H, s), 7.47 (1H, d, J=8 Hz), 8.00 (1H, d, J=8 Hz), 8.26 (1H, s)
19			Pale yellow oil	1.57 (2H, brs), 3.97 (2H, s), 7.15-7.30 (2H, m), 7.44 (1H, d, J=7 Hz), 7.52 (1H, d, J=7 Hz)
20			Pale yellow oil	1.52 (2H, brs), 2.18 (2H, s), 3.05 (3H, s), 3.89 (2H, s), 5.20 (2H, s), 6.95 (1H, d, J=8 Hz), 7.14 (1H, s), 7.32 (1H, d, J=8 Hz)
21			Pale yellow oil	1.51 (2H, brs), 2.34 (2H, s), 3.52 (3H, s), 3.89 (2H, s), 5.28 (2H, s), 6.81 (1H, d, J=8 Hz), 7.05-7.16 (2H, m)
22			Colorless oil	0.92 (3H, t, J=7 Hz), 1.08 - 1.18 (2H, m), 1.40-2.05 (9H, m), 2.45-2.62 (1H, m), 2.62 - 2.90 (2H, m), 3.80-3.95 (2H, m)
23			Pale yellow oil	1.92 (2H, m), 2.82 (2H, t, J=7 Hz), 2.84 (2H, t, J=7 Hz), 6.41 (1H, s), 7.13-7.25 (2H, m), 7.35-7.50 (2H, m)
24			Pale yellow oil	1.83 (2H, brs), 3.56 (3H, s), 3.40 (2H, s), 5.37 (2H, s), 6.55 (1H, s), 7.04 (1H, d, J=8 Hz), 7.05-7.21 (2H, m)

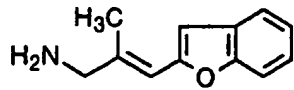
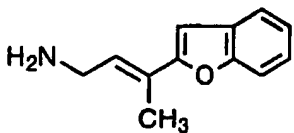
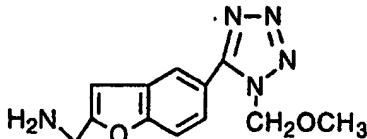
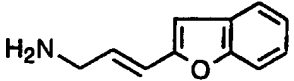
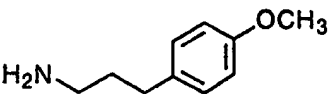
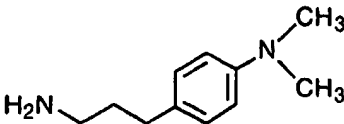
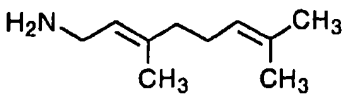
- 255 -

25			White powder	1.51 (2H, brs), 2.17 (3H, s), 3.89 (2H, s), 5.10 (2H, s), 6.94 (1H, d, J=8 Hz), 7.02 (1H, s), 7.27-7.50 (6H, m)
26			Pale yellow oil	1.26 (3H, t, J=7 Hz), 2.92 (2H, q, J=7 Hz), 3.95 (3H, s), 4.24 (2H, s), 7.41 (1H, d, J=9 Hz), 8.00 (1H, d, J=9 Hz), 8.25 (1H, s)
27			Yellow oil	1.89 (2H, brs), 4.13 (2H, s), 7.2-7.5 (3H, m), 7.7-7.9 (2H, m)
28			Pale yellow oil	1.97 (2H, brs), 4.05 (2H, s), 7.2-7.6 (9H, m)
29			Brown oil	1.59 (2H, brs), 4.10 (2H, s), 7.54 (1H, dd, J=8 Hz, 8 Hz), 7.69 (1H, dd, J=8 Hz, 8 Hz), 7.80 (1H, d, J=8 Hz), 8.0-8.2 (2H, m), 8.89 (2H, s)
30			Pale yellow oil	2.27 (3H, s), 3.97 (3H, s), 4.52 (2H, d, J=6 Hz), 7.42 (1H, d, J=8 Hz), 7.98 (1H, d, J=8 Hz), 8.20 (1H, s),
31			Color - less oil	1.52 (3H, d, J=6 Hz), 1.83 (2H, brs), 4.20 (1H, q, J=6 Hz), 6.50 (1H, s), 7.15-7.30 (2H, m), 7.43 (1H, d, J=8 Hz), 7.51 (1H, d, J=8 Hz)
32			Pale yellow oil	2.20 (3H, brs), 4.00 (2H, s), 5.08 (1H, s), 5.34 (1H, brs), 6.52 (1H, s), 7.38 (2H, s), 7.56 (1H, s)

- 256 -

33			White powder	1.64 (2H, brs), 3.95 (3H, s), 4.17 (2H, s), 7.21 (1H, s), 7.84 (1H, d, J=8 Hz), 7.94 (1H, d, J=8 Hz), 8.40 (1H, s)
34			Pale yellow oil	1.60 (2H, brs), 2.18 (3H, s), 3.51 (3H, s), 3.91 (2H, s), 5.20 (2H, s), 6.95 (1H, d, J=8 Hz), 7.10 (1H, s), 7.29 (1H, d, J=8 Hz)
35			Yellow oil	1.14 (3H, s), 1.44 (3H, s), 2.8 - 3.1 (2H, m), 4.2-4.3 (1H, m), 6.7-7.2 (4H, m)
36			Yellow oil	1.35 (2H, brs), 2.8-3.1 (3H, m), 3.2-3.4 (1H, m), 4.7-4.9 (1H, m), 6.7-6.9 (2H, m), 7.0 - 7.2 (2H, m)
37			Pale yellow oil	1.57 (3H, d, J=8 Hz), 1.79 (2H, brs), 2.07 (3H, s), 3.97 (2H, s), 5.97 (1H, q, J=8 Hz), 6.52 (1H, s), 7.25 (3H, d, J=8 Hz), 7.40 (1H, d, J=8 Hz), 7.52 (1H, s)
38			Pale brown oil	1.45 (3H, t, J=7 Hz), 1.74 (2H, s), 4.05 (2H, s), 4.46 (2H, q, J=7 Hz), 6.58 (1H, s), 7.20-7.35 (1H, m), 7.70 (1H, d, J=8 Hz), 7.89 (1H, d, J=8 Hz)
39			Pale brown oil	1.60 (2H, brs), 4.03 (2H, s), 6.61 (1H, s), 7.20-7.35 (1H, m), 7.48 (1H, d, J=8 Hz), 7.69 (1H, d, J=8 Hz)
40			Pale brown oil	1.56 (2H, brs), 4.01 (2H, s), 6.60 (1H, s), 7.50 (2H, s), 7.81 (1H, s)

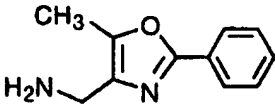
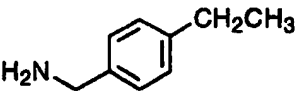
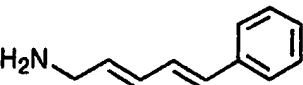
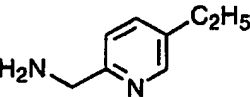
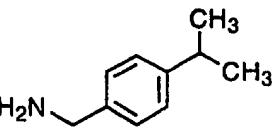
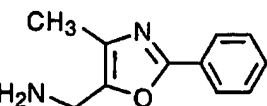
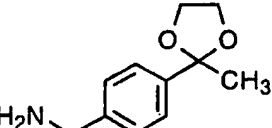
- 257 -

41			Pale yellow oil	2.14 (3H, s), 3.43 (2H, s), 6.39 (1H, brs), 6.59 (1H, s), 7.15-7.25 (2H, m), 7.40-7.50 (2H, m)
42			Pale yellow oil	2.04 (3H, s), 3.54 (2H, d, J=7 Hz), 6.44 (1H, t, J=7 Hz), 6.60 (1H, s), 7.15-7.30 (2H, m), 7.46 (1H, d, J=7 Hz), 7.51 (1H, d, J=7 Hz)
43	 (A mixture of compounds with 1- or 2-methoxymethyl group)		Pale yellow oil	3.53 and 3.60 (3H, s), 4.02 and 4.04 (2H, s), 5.89 and 5.72 (2H, s), 6.62 and 6.66 (1H, s), 7.54 and 7.62 (1H, d, J=9 Hz), 8.00 and 8.02 (1H, d, J=9 Hz), 8.37 (1H, s)
44			Pale yellow oil	3.54 (2H, d, J=5 Hz), 6.43 - 6.63 (3H, m), 7.13-7.30 (2H, m), 7.40-7.55 (2H, m)
45			Pale yellow oil	1.39 (2H, brs), 1.67-1.80 (2H, m), 2.60 (2H, t, J=6 Hz), 2.72 (2H, t, J=6 Hz), 3.79 (3H, s), 6.82 (2H, d, J=8 Hz), 7.09 (2H, d, J=8 Hz)
46			Pale yellow oil	1.28 (2H, brs), 1.15-1.30 (2H, m), 2.56 (2H, t, J=7 Hz), 2.72 (2H, t, J=7 Hz), 2.91 (6H, s), 6.69 (2H, d, J=8 Hz), 7.07 (2H, d, J=8 Hz)
47			Pale brown oil	1.27 (2H, brs), 1.61 (3H, s), 1.63 (3H, s), 1.71 (3H, s), 1.95-2.15 (4H, m), 3.27 (2H, d, J=7 Hz), 5.05-5.15 (1H, m), 5.20-5.31 (1H, m)

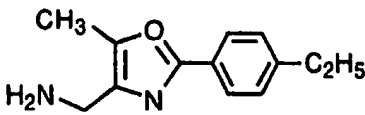
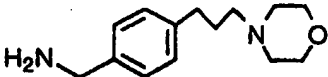
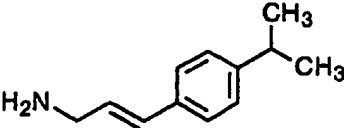
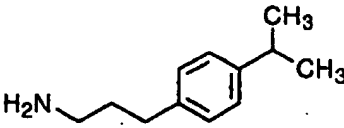
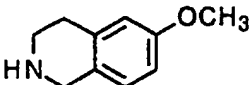
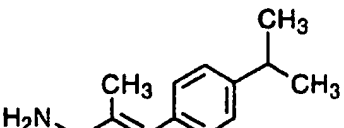
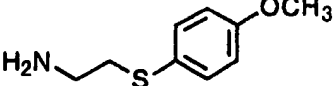
- 258 -

48			Brown oil	2.50 (3H, s), 3.90 (2H, s), 7.3-7.5 (3H, m), 7.8-8.0 (2H, m)
49			Yellow oil	1.26 (2H, br), 3.49 (2H, d, J=6 Hz), 3.88 (3H, s), 3.90 (3H, s), 6.2-6.3 (1H, m), 6.42 (1H, d, J=16 Hz), 6.82 (1H, d, J=8 Hz), 6.9-7.0 (2H, m)
50			Yellow oil	1.30 (2H, br), 3.53 (2H, d, J=6 Hz), 6.2-6.4 (1H, m), 6.90 (1H, d, J=16 Hz), 7.1 - 7.3 (2H, m), 7.3-7.5 (2H, m)
51			Pale brown powder	1.53 (2H, brs), 4.03 (2H, s), 7.35-7.50 (3H, m), 7.70-7.92 (4H, m)
52			Brown oil	1.78 (2H, brs), 4.31 (2H, s), 7.30-7.50 (2H, m), 7.88 (1H, d, J =7 Hz), 7.97 (1H, d, J=7 Hz)
53			Yellow oil	1.30 (2H, brs), 3.45 (2H, d, J=6 Hz), 3.81 (3H, s), 6.0 - 6.2 (1H, m), 6.48 (1H, d, J=16 Hz), 6.82 (2H, d, J=8 Hz), 7.20 (2H, d, J=8 Hz)
54			Yellow oil	1.25 (2H, br), 3.48 (2H, d, J=6 Hz), 3.86 (3H, s), 6.3 - 6.5 (1H, m), 6.7-6.9 (3H, m), 7.20 (1H, m), 7.42 (1H, d, J=8 Hz)
55			Brown oil	1.36 (2H, brs), 3.54 (2H, d, J=6 Hz), 6.2-6.4 (1H, m), 6.98 (1H, d, J=16 Hz), 7.37 (1H, m), 7.5-7.7 (2H, m), 7.90 (1H, d, J=8 Hz)

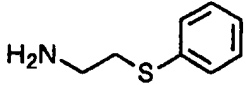
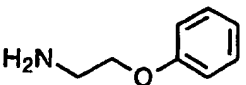
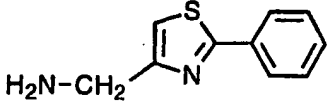
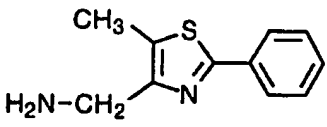
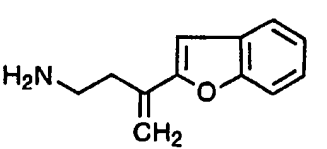
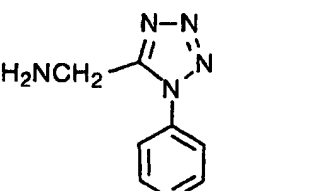
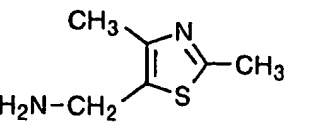
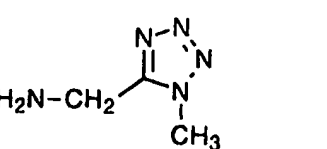
- 259 -

56			White powder	2.37 (3H, s), 3.74 (2H, s), 7.4-7.5 (3H, m), 7.95-8.05 (2H, m)
57			Yellow oil	1.23 (2H, t, J=8 Hz), 1.49 (2H, brs), 2.63 (2H, q, J=8 Hz), 3.82 (2H, s), 7.16 (2H, d, J=8 Hz), 7.22 (2H, d, J=8 Hz)
58			Pale yellow oil	1.39 (2H, brs), 3.40 (2H, d, J=6 Hz), 5.85-6.00 (1H, m), 6.32 (1H, dd, J=16 Hz, 10 Hz), 6.52 (1H, d, J=16 Hz), 6.78 (1H, dd, J=16 Hz, 10 Hz), 7.15-7.42 (5H, m)
59			Brown oil	1.24 (3H, t, J=8 Hz), 1.91 (2H, brs), 2.64 (2H, q, J=8 Hz), 3.94 (2H, s), 7.19 (1H, d, J=8 Hz), 7.48 (1H, d, J=8 Hz), 8.40 (1H, s)
60			Colorless oil bp.80°C/ 0.3 mmHg	7.24 (2H, d, J=8 Hz), 7.20 (2H, d, J=8 Hz), 3.83 (2H, s), 2.90 (1H, sep, J=7 Hz), 1.40 (2H, br), 1.25 (6H, d, J=7 Hz)
61			White powder	2.22 (3H,s), 3.92 (2H, s), 7.4 - 7.5 (3H, m), 8.00-8.05 (2H, m)
62			Colorless oil	7.45 (2H, d, J=8 Hz), 7.29 (2H, d, J=8 Hz), 4.04 (2H, m), 3.87 (2H, s), 3.77 (2H, m), 1.77 (2H, br), 1.65 (3H, s)

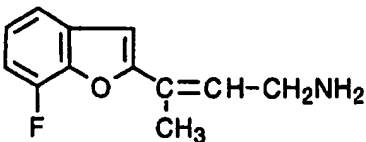
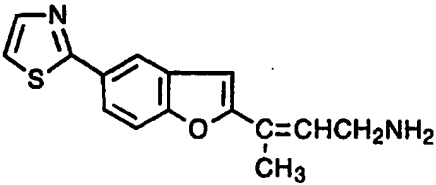
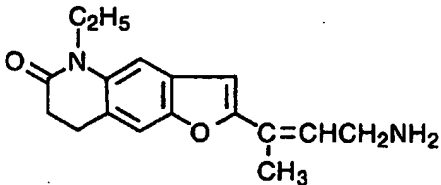
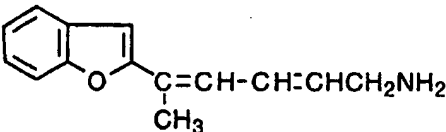
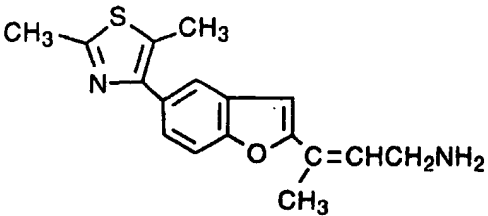
- 260 -

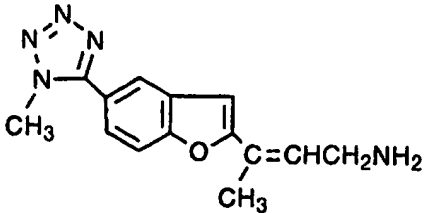
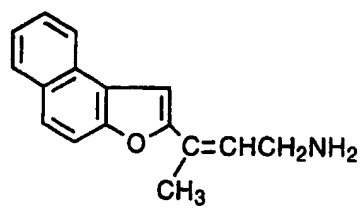
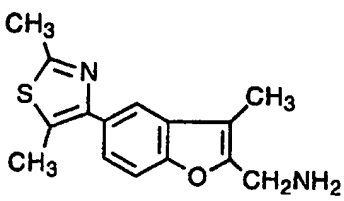
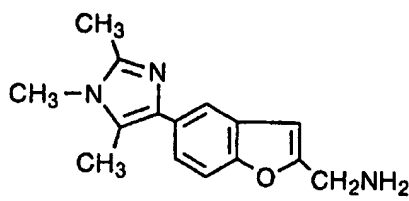
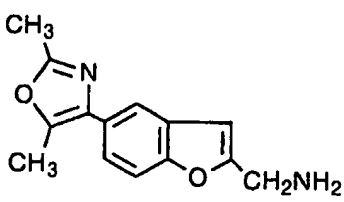
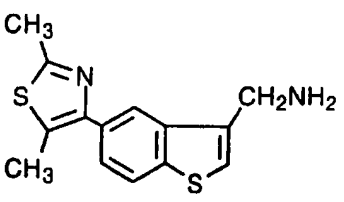
63			Pale yellow powder	1.20 (3H, t, J=8 Hz), 2.36 (3H, s), 2.65 (2H, q, J=8 Hz), 2.82 (2H, brs), 3.58 (2H, s), 7.33 (2H, d, J=8 Hz), 8.06 (2H, d, J=8 Hz)
64			Yellow oil	1.62 (2H, brs), 1.7-1.9 (2H, m), 2.3-2.5 (6H, m), 2.63 (2H, t, J=8 Hz), 3.72 (4H, t, J=5 Hz), 3.83 (2H, s), 7.15 (2H, d, J=8 Hz), 7.23 (2H, d, J=8 Hz)
65			Color - less oil	7.29 (2H, d, J=8 Hz), 7.16 (2H, d, J=8 Hz), 6.48 (1H, d, J=16 Hz), 6.28 (1H, dt, J=16 Hz, 6 Hz), 3.47 (2H, d, J=6 Hz), 2.88 (1H, sep, J=7 Hz), 1.72 (2H, br), 1.23 (6H, d, J=7 Hz)
66			Color - less oil	7.15 (2H, d, J=8 Hz), 7.11 (2H, d, J=8 Hz), 2.88 (1H, sep, J=7 Hz), 2.74 (2H, t, J=7 Hz), 2.63 (2H, t, J=7 Hz), 1.77 (2H, qui, J=7 Hz), 1.24 (6H, d, J=7 Hz), 1.55 (2H, br)
67			Pale yellow oil	2.77 (2H, t, J=6 Hz), 3.12 (2H, t, J=6 Hz), 3.78 (3H, s), 3.95 (2H, s), 6.63 (1H, brs), 6.69 (1H, brd, J=8 Hz), 6.92 (1H, d, J=8 Hz)
68			Color - less oil	7.20 (4H, s), 6.41 (1H, brs), 3.39 (2H, s), 2.90 (1H, sep, J=7 Hz), 2.09 (2H, br), 1.91 (3H, brs), 1.25 (6H, d, J=7 Hz)
69			Color - less oil	1.38 (2H, brs), 2.80-2.95 (4H, m), 3.80 (3H, s), 6.84 (2H, d, J=8 Hz), 7.38 (2H, d, J=8 Hz)

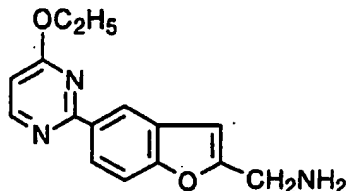
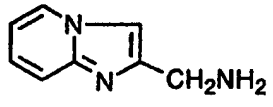
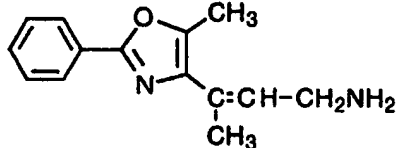
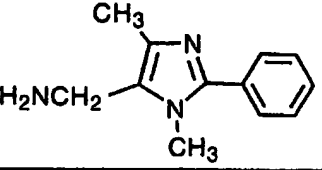
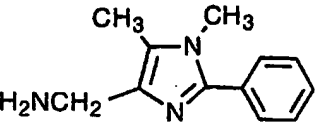
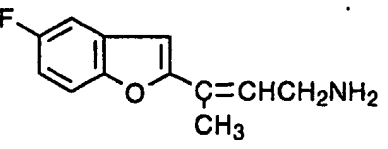
- 261 -

70			Color - less oil	1.38 (2H, brs), 2.80-2.90 (2H, m), 2.90-3.05 (2H, m), 7.10-7.40 (5H, m)
71			Color - less oil	1.47 (2H, brs), 3.08 (2H, t, J=5 Hz), 4.01 (2H, t, J=5 Hz), 6.85-7.00 (3H, m), 7.25 - 7.35 (2H, m)
72			Pale yellow oil	7.9-8.0 (2H, m), 7.4-7.5 (3H, m), 7.08 (1H, s), 4.05 (2H, s)
73			Pale yellow oil	7.85-7.95 (2H, m), 7.4-7.5 (3H, m), 3.88 (2H, s), 2.45 (3H, s)
74			Yellow oil	7.5-7.6 (1H, m), 7.4-7.5 (1H, m), 7.2-7.3 (2H, m), 6.69 (1H, s), 5.90 (1H, s), 5.23 (1H, s), 2.98 (2H, t, J=6.0 Hz), 2.62 (2H, t, J=6.0 Hz)
75			Pale yellow oil	7.58 (5H, brs), 4.17 (2H, s)
76			Pale yellow oil	3.88 (2H, s), 2.59 (3H, s), 2.53 (3H, s)
77			Pale yellow oil	4.16 (2H, s), 4.23 (3H, s)

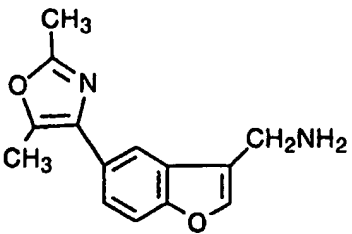
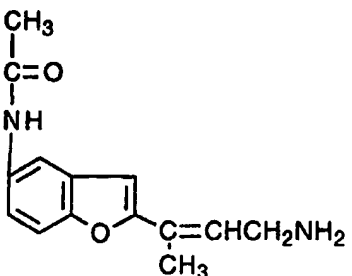
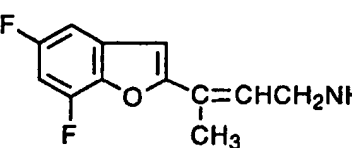
- 262 -

78			Pale yellow oil	1.23 (2H, br), 2.04 (3H, s), 3.55 (2H, d, J=7 Hz), 6.51 (1H, t, J=7 Hz), 6.62 (1H, d, J=3 Hz), 6.90-7.15 (2H, m), 7.40 - 7.60 (2H, m)
79			White solid	1.41 (2H, br), 2.04 (3H, s), 3.56 (2H, d, J=7 Hz), 6.46 (1H, t, J=7 Hz), 6.64 (1H, s), 7.30 (1H, d, J=3 Hz), 7.46 (1H, d, J=9 Hz), 7.85 (1H, d, J=2 Hz), 7.86 (1H, dd, J=9 Hz, 3 Hz), 8.13 (1H, d, J=2 Hz)
80			Pale yellow oil	1.30 (3H, t, J=7 Hz), 1.56 (2H, br), 2.02 (3H, s), 2.64 (2H, t, J=7 Hz), 2.96 (2H, t, J=7 Hz), 3.54 (2H, d, J=7 Hz), 4.04 (2H, q, J=7 Hz), 6.41 (1H, t, J=7 Hz), 6.56 (1H, s), 7.12 (1H, s), 7.21 (1H, s)
81			Yellow powder	2.13 (3H, s), 3.47 (2H, d, J=7 Hz), 6.05 (1H, dt, J=15 Hz, 7 Hz), 6.57 (1H, dd, J=15 Hz, 12 Hz), 6.65 (1H, s), 6.97 (1H, d, J=12 Hz), 7.15 - 7.42 (2H, m), 7.43 (1H, d, J=8 Hz), 7.51 (1H, d, J=8 Hz)
82			Pale yellow powder	2.05 (3H, s), 2.52 (3H, s), 2.69 (3H, s), 3.56 (2H, d, J=7 Hz), 6.46 (1H, t, J=7 Hz), 6.62 (1H, s), 7.45 (1H, d, J=8 Hz), 7.51 (1H, d, J=8 Hz), 7.73 (1H, s)

83			Yellow powder	2.07 (3H, s), 3.58 (2H, d, J=7 Hz), 4.20 (3H, s), 6.52 (1H, t, J=7 Hz), 6.68 (1H, s), 7.59 (2H, s), 7.89 (1H, s)
84			Pale yellow powder	2.11 (3H, s), 3.57 (2H, d, J=7 Hz), 6.47 (1H, t, J=7 Hz), 7.10 (1H, s), 7.43-7.62 (3H, m), 7.69 (1H, d, J=8 Hz), 7.93 (1H, d, J=8 Hz), 8.11 (1H, d, J=8 Hz)
85			Yellow oil	1.78 (2H, brs), 2.23 (3H, s), 2.52 (3H, s), 2.70 (3H, s), 3.96 (2H, s), 7.4 - 7.5 (2H, m), 7.70 (1H, s)
86			Yellow powder	1.53 (2H, brs), 2.37 (3H, s), 2.43 (3H, s), 3.48 (3H, s), 3.97 (2H, s), 6.52 (1H, s), 7.4-7.6 (2H, m), 7.72 (1H, s)
87			Yellow oil	1.56 (2H, brs), 2.47 (3H, s), 2.51 (3H, s), 3.98 (2H, s), 6.54 (1H, s), 7.4 - 7.6 (2H, m), 7.77 (1H, s),
88			Color - less oil	1.56 (2H, brs), 2.54 (3H, s), 2.71 (3H, s), 4.17 (2H, s), 7.33 (1H, s), 7.61 (1H, d, J=8 Hz), 7.90 (1H, d, J=8 Hz), 8.01 (1H, s)

89			White powder	1.46 (3H, t, J=7 Hz), 1.57 (2H, brs), 3.98 (2H, s), 4.57 (2H, q, J=7 Hz), 6.57 (1H, d, J=6 Hz), 6.59 (1H, s), 7.49 (1H, d, J=9 Hz), 8.38 (1H, d, J=9 Hz), 8.48 (1H, d, J=6 Hz), 8.61 (1H, s)
90			Brown oil	1.62 (2H, brs), 4.03 (2H, s), 6.75 (1H, dd, J=7 Hz, 7 Hz), 7.15 (1H, dd, J=7 Hz, 8 Hz), 7.48 (1H, s), 7.54 (1H, d, J=8 Hz), 8.07 (1H, d, J=7 Hz)
91			Pale yellow powder	1.29 (2H, brs), 2.06 (3H, s), 2.50 (3H, s), 3.50 (2H, d, J=7 Hz), 6.05 (1H, t, J=7 Hz), 7.4 - 7.5 (3H, m), 7.9-8.1 (2H, m)
92			Colorless oil	1.2-1.5 (2H, br), 2.27 (3H, s), 3.71 (3H, s), 3.88 (2H, s), 7.3 - 7.7 (5H, m)
93			Pale yellow oil	1.55 (2H, brs), 2.26 (3H, s), 3.56 (3H, s), 3.78 (2H, s), 7.3 - 7.6 (5H, m)
94			Pale yellow powder	1.25 (2H, brs), 2.01 (3H, s), 3.54 (2H, d, J=7 Hz), 6.43 (1H, t, J=7 Hz), 6.55 (1H, s), 6.9-7.0 (1H, m), 7.15 (1H, d, J=9 Hz), 7.2-7.4 (1H, m)

- 265 -

95			Pale yellow oil	1.65 (2H, brs), 2.48 (3H, s), 2.51 (3H, s), 4.03 (2H, s), 7.4 - 7.6 (3H, m), 7.87 (1H, s)
96			Pale yellow powder	DMSO-d ₆ : 1.96 (3H, s), 2.04 (3H, s), 3.36 (2H, d, J=7 Hz), 6.31 (1H, t, 7 Hz), 6.82 (1H, s), 7.31 (1H, dd, J=2 Hz, 9 Hz), 7.42 (1H, d, 9 Hz), 7.90 (1H, d, J=2 Hz), 9.91 (1H, s)
97			Yellow powder	1.31 (2H, brs), 2.02 (3H, s), 3.55 (2H, d, J=7 Hz), 6.51 (1H, t, J=7 Hz), 6.58 (1H, d, J=3 Hz), 6.77 (1H, dd, J=10 Hz, 10 Hz), 6.97 (1H, d, J=8 Hz)

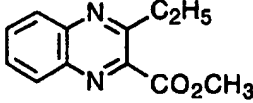
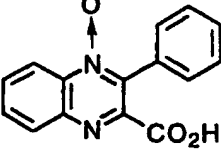
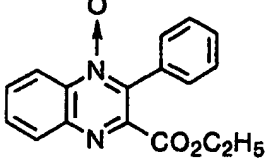
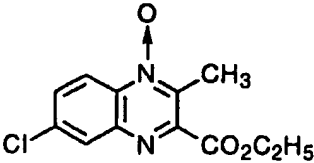
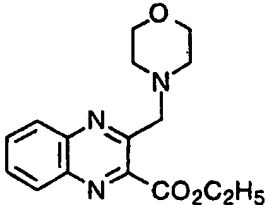
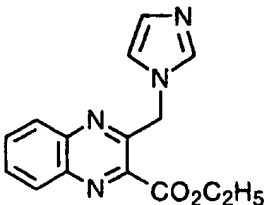
Using suitable starting compounds, there are obtained the compounds as listed in Table 2 in the same manner as in Reference Examples 15-21.

- 266 -

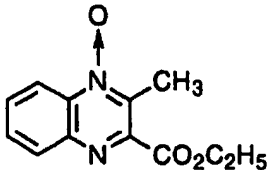
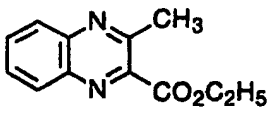
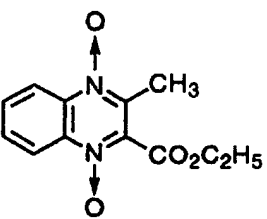
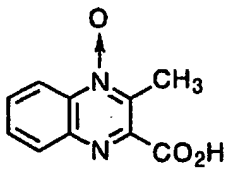
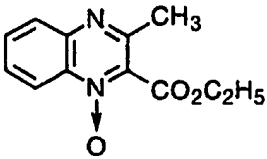
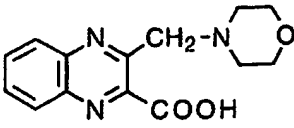
Table 2

No.	Structure	m.p. °C	Crystalline Form	¹ H-NMR (CDCl ₃) δ pm:
1			Pale yellow powder	1.48 (3H, t, J=7 Hz), 4.58 (2H, q, J=7 Hz), 7.95-8.05 (2H, m), 8.20 -8.32 (2H, m)
2		64- 65	Pale yellow powder	1.18 (3H, t, J=7 Hz), 4.34 (2H, q, J=7 Hz), 7.45-7.55 (3H, m), 7.70-7.80 (2H, m), 7.80-7.90 (2H, m), 8.15-8.25 (2H, m)
3		154- 155	Yellow powder	4.12 (3H, s), 7.80-7.95 (2H, m), 8.34 (1H, d, J=8 Hz), 8.61 (1H, d, J=8 Hz), 9.04 (1H, s)
4			Pale yellow powder	1.48 (3H, t, J=7 Hz), 1.52 (6H, d, J=8 Hz), 3.6-3.8 (1H, m), 4.54 (2H, q, J=7 Hz), 7.7 - 7.9 (2H, m), 8.0-8.2 (1H, m), 8.5-8.6 (1H, m)
5			Yellow powder	1.38 (3H, t, J=7 Hz), 3.27 (2H, q, J=7 Hz), 4.09 (3H, s), 7.7-7.9 (2H, m), 8.1-8.3 (1H, m), 8.5-8.7 (1H, m)
6			Yellow powder	1.42 (3H, d, J=7 Hz), 1.49 (3H, t, J=7 Hz), 3.6-3.8 (1H, m), 4.56 (2H, q, J=7 Hz), 7.7 - 7.9 (2H, m), 8.0-8.2 (2H, m)

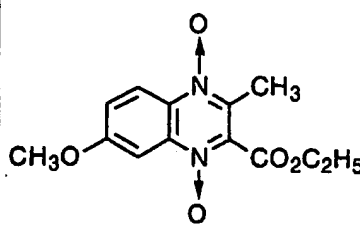
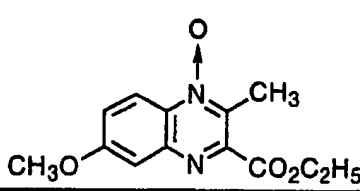
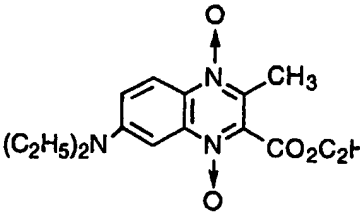
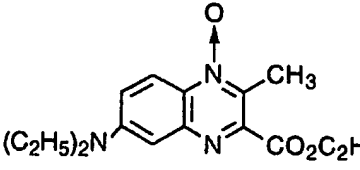
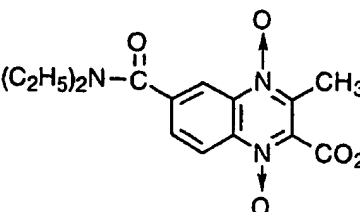
- 267 -

7			Pale brown powder	1.43 (3H, t, J=7 Hz), 3.30 (2H, q, J=7 Hz), 4.09 (3H, s), 7.7-7.9 (2H, m), 8.09 (1H, dd, J=2 Hz, 8 Hz), 8.18 (1H, dd, J=2 Hz, 8 Hz)
8			Pale yellow powder	DMSO-d ₆ : 7.45-7.60 (5H, m), 7.85-8.05 (2H, m), 8.21 (1H, d, J=8 Hz), 8.48 (1H, d, J=8 Hz)
9		106 - 108	Pale yellow powder	1.03 (3H, t, J=7 Hz), 4.18 (2H, q, J=7 Hz), 7.45-7.60 (5H, m), 7.75-7.95 (2H, m), 8.25 (1H, d, J=8 Hz), 8.64 (1H, d, J=8 Hz)
10			Yellow flakes (diisopropyl ether)	1.49 (3H, t, J=7 Hz), 2.78 (3H, s), 4.56 (2H, q, J=7 Hz), 7.73 (1H, dd, J=2 Hz, 9 Hz), 8.18 (1H, d, J=2 Hz), 8.53 (1H, d, J=9 Hz)
11			Yellow oil	1.49 (3H, t, J=7 Hz), 3.0-3.2 (4H, m), 3.8-4.0 (4H, m), 4.56 (2H, q, J=7 Hz), 4.56 (2H, s), 7.8-7.9 (2H, m), 8.0-8.1 (1H, m), 8.2-8.3 (1H, m)
12			Yellow powder	1.47 (3H, t, J=7 Hz), 4.55 (2H, d, J=7 Hz), 5.82 (2H, s), 7.04 (2H, d, J=5 Hz), 7.70 (1H, s), 7.8-8.0 (2H, m), 8.0 - 8.1 (1H, m), 8.2-8.3 (1H, m)

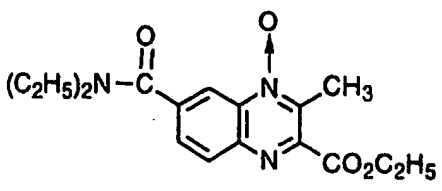
- 268 -

13		91-93	Colorless needles (n-hexane/ diethyl ether)	1.49 (3H, t, J=7 Hz), 2.81 (3H, s), 4.56 (2H, q, J=7 Hz), 7.75-7.85 (2H, m), 8.15-8.25 (1H, m), 8.55-8.65 (1H, m)
14		74-75	Colorless needles (n-pentane)	1.50 (3H, t, J=7 Hz), 2.96 (3H, s), 4.57 (2H, q, J=7 Hz), 7.70-7.90 (2H, m), 8.05 (1H, d, J=8 Hz), 8.19 (1H, d, J=8 Hz)
15		137 - 138	Pale yellow needles (ethyl acetate)	1.48 (3H, t, J=7 Hz), 2.60 (3H, s), 4.59 (2H, q, J=7 Hz), 7.30-7.46 (2H, m), 8.53-8.67 (2H, m)
16		143 - 145 (dec)	White powder	2.87 (3H, s), 7.75-7.90 (2H, m), 8.15-8.25 (1H, m), 8.54 - 8.65 (1H, m)
17		85-87	Colorless prisms (n-hexane/ ethyl acetate)	1.50 (3H, t, J=7 Hz), 2.68 (3H, s), 4.58 (2H, q, J=7 Hz), 7.65-7.90 (2H, m), 8.04 (1H, d, J=8 Hz), 8.53 (1H, d, J=8 Hz)
18			Yellow powder	3.0-3.2 (4H, m), 3.9-4.0 (4H, m), 4.56 (2H, s), 7.8-7.9 (2H, m), 8.0-8.1 (1H, m), 8.2-8.3 (1H, m)

- 269 -

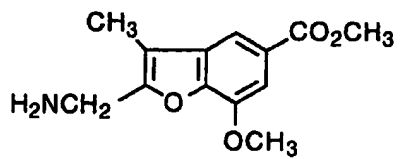
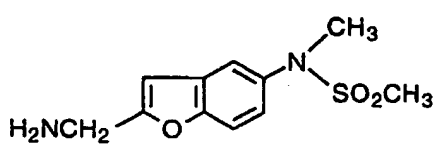
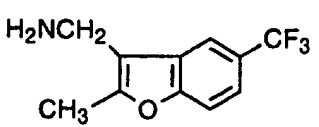
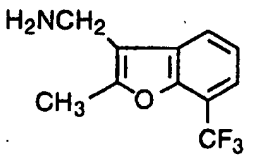
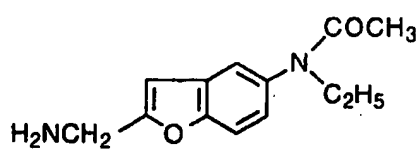
19			Yellow powder	1.48 (3H, t, J=7 Hz), 2.56 (3H, s), 4.00 (3H, s), 4.59 (2H, q, J=7 Hz), 7.46 (1H, dd, J=3 Hz, 10 Hz), 7.86 (1H, d, J=3 Hz), 8.51 (1H, d, J=10 Hz)
20			Yellow powder	1.49 (3H, t, J=7 Hz), 2.78 (3H, s), 3.96 (3H, s), 4.56 (2H, q, J=7 Hz), 7.3-7.5 (2H, m), 8.48 (1H, d, J=9 Hz)
21			Brown powder	1.26 (6H, t, J=7 Hz), 1.47 (3H, t, J=7 Hz), 2.52 (3H, s), 3.52 (4H, q, J=7 Hz), 4.57 (2H, q, J=7 Hz), 7.27 (1H, dd, J=3 Hz, 10 Hz), 7.42 (1H, d, J=3 Hz), 8.39 (1H, d, J=10 Hz)
22			Brown powder	1.25 (6H, t, J=7 Hz), 1.47 (3H, t, J=7 Hz), 2.73 (3H, s), 3.50 (4H, q, J=7 Hz), 4.53 (2H, q, J=7 Hz), 7.08 (1H, d, J=3 Hz), 7.29 (1H, dd, J=3 Hz, 10 Hz), 8.38 (1H, d, J=10 Hz)
23			Brown powder	1.0-1.4 (6H, br), 1.48 (3H, t, J=7 Hz), 2.60 (3H, s), 3.1 - 3.7 (4H, br), 4.59 (2H, q, J=7 Hz), 7.8-7.9 (1H, m), 8.5-8.6 (2H, m)

- 270 -

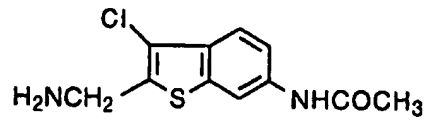
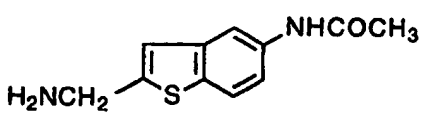
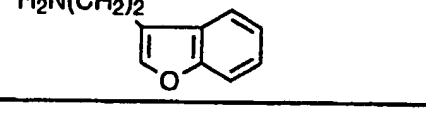
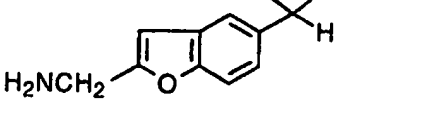
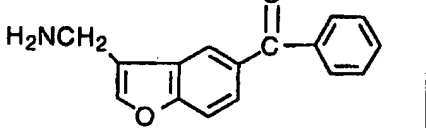
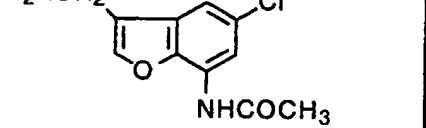
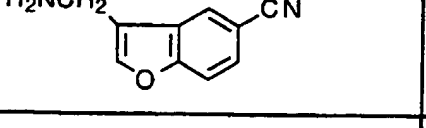
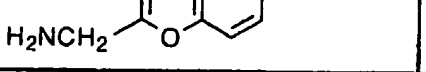
24		Brown powder	1.0-1.4 (6H, br), 1.49 (3H, t, J=7 Hz), 2.81 (3H, s), 3.2 - 3.8 (4H, br), 4.56 (2H, q, J=7 Hz), 7.80 (1H, dd, J=2 Hz, 9 Hz), 8.24 (1H, d, J=9 Hz), 8.58 (1H, d, J=2 Hz)
----	---	--------------	---

Using the suitable starting compounds, there are obtained the compounds as listed in Table 3 in the same manner as in Reference Example 3, 9, 11 and 14.

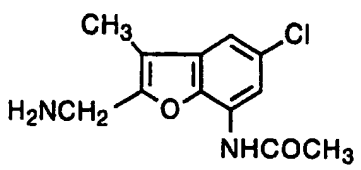
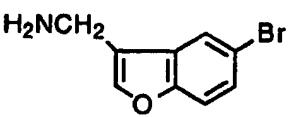
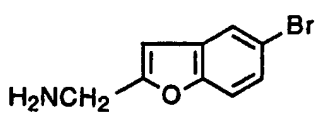
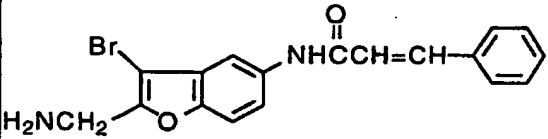
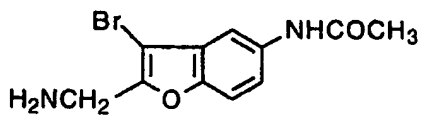
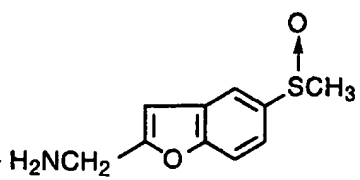
Table 3

No.	Structure	Crystalline Form	¹ H-NMR (CDCl ₃) δ ppm:
1		Pale yellow solid	1.61 (2H, br), 2.23 (3H, s), 3.95 (5H, s), 4.05 (3H, s), 7.50 (1H, s), 7.85 (1H, s)
2		Pale orange solid	1.56 (2H, br), 2.87 (3H, s), 3.36 (3H, s), 3.98 (2H, s), 6.53 (1H, s), 7.24 (1H, d, J=9 Hz), 7.43 (1H, d, J=9 Hz), 7.54 (1H, s)
3		Pale yellow oil	1.43 (2H, br), 2.47 (3H, s), 3.95 (2H, s), 7.40-7.60 (2H, m), 7.85 (1H, s)
4		Pale yellow oil	1.44 (2H, br), 2.50 (3H, s), 3.94 (2H, s), 7.20-7.35 (1H, m), 7.45 (1H, d, J=9 Hz), 7.75 (1H, d, J=9 Hz)
5		Pale yellow oil	1.12 (3H, t, J=7 Hz), 1.67 (2H, br), 1.82 (3H, s), 3.77 (2H, q, J=7 Hz), 4.01 (2H, s), 6.56 (1H, s), 7.03 (1H, d, J=9 Hz), 7.30 (1H, s), 7.46 (1H, d, J=9 Hz)

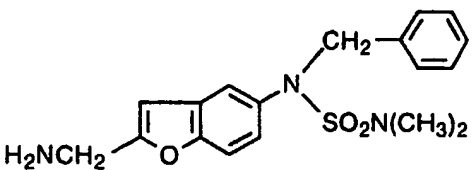
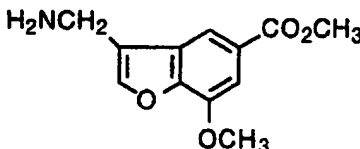
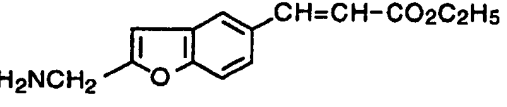
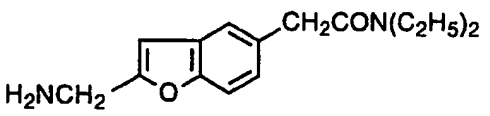
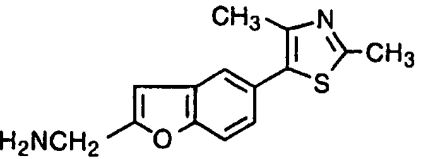
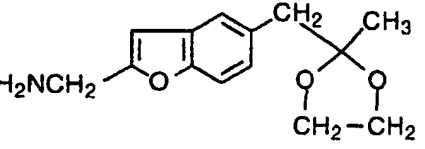
- 271 -

6	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	Yellow powder	DMSO-d ₆ : 2.18 (3H, s), 4.13 (2H, s), 7.43 (1H, d, J=9 Hz), 7.63 (1H, d, J=9 Hz), 8.38 (1H, s), 9.42 (1H, br)
7	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	White powder	1.60 (2H, br), 2.21 (3H, s), 4.13 (2H, s), 7.09 (1H, s), 7.15-7.30 (2H, m), 7.70 (1H, d, J=9 Hz), 8.03 (1H, s)
8	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	Pale brown oil	1.56 (2H, br), 2.83 (2H, t, J=7 Hz), 3.05 (2H, t, J=7 Hz), 7.20 - 7.40 (2H, m), 7.40-7.65 (3H, m)
9	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	Pale brown oil	1.58 (2H, br), 3.97 (2H, s), 4.00 - 4.25 (4H, m), 5.89 (1H, s), 6.53 (1H, s), 7.37 (1H, d, J=8 Hz), 7.44 (1H, d, J=8 Hz), 7.65 (1H, s)
10	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	Pale yellow oil	1.54 (2H, br), 4.04 (2H, s), 7.45 - 7.70 (5H, m), 7.75-7.90 (3H, m), 8.12 (1H, s)
11	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	White powder	1.48 (2H, br), 2.27 (3H, s), 3.97 (2H, s), 7.31 (1H, s), 7.55 (1H, s), 7.61 (1H, br), 8.25 (1H, s)
12	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	Pale yellow powder	1.48 (2H, br), 4.04 (2H, s), 7.50 - 7.65 (2H, m), 7.68 (1H, s), 8.01 (1H, s)
13	 <chem>CC(=O)Nc1ccc2sc(cc2c1)CN</chem>	Orange solid	1.58 (2H, br), 2.17 (3H, s), 3.92 (2H, s), 7.20-7.40 (2H, m), 7.57 (1H, s)

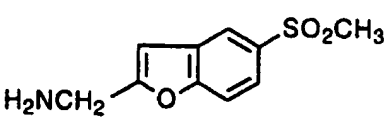
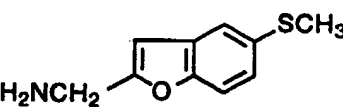
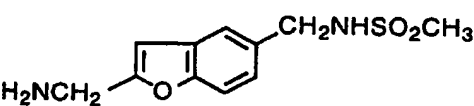
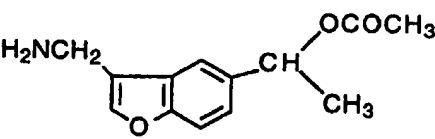
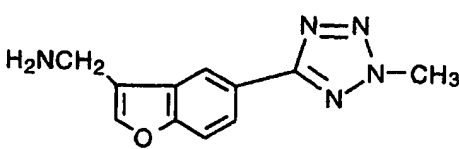
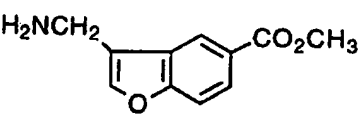
- 272 -

14		Pale yellow powder	1.58 (2H, br), 2.17 (3H, s), 2.27 (3H, s), 3.95 (2H, s), 7.15 (1H, s), 7.70 (1H, br), 8.21 (1H, s)
15		Pale yellow oil	1.51 (2H, br), 3.97 (2H, s), 7.30-7.45 (2H, m), 7.55 (1H, s), 7.75 (1H, s)
16		Pale yellow oil	1.58 (2H, br), 3.97 (2H, s), 6.53 (1H, s), 7.20 - 7.60 (3H, m)
17		Pale brown oil	1.61 (2H, br), 4.00 (2H, s), 6.58 (1H, d, J=16 Hz), 7.30-7.90 (10H, m)
18		Pale brown solid	1.61 (2H, br), 2.20 (3H, s), 4.00 (2H, s), 7.35 (2H, s), 7.46 (1H, br), 7.68 (1H, s)
19		Pale yellow solid	1.61 (2H, br), 2.75 (3H, s), 4.01 (2H, s), 6.62 (1H, s), 7.49 (1H, d, J=9 Hz), 7.57 (1H, d, J=9 Hz), 7.89 (1H, s)

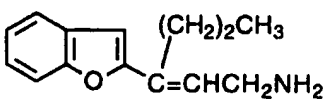
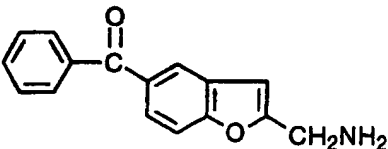
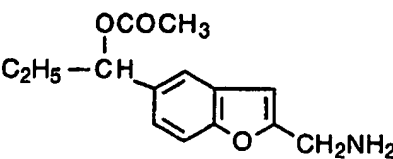
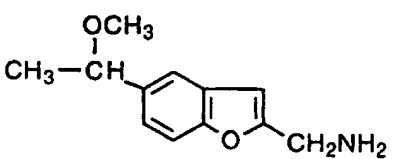
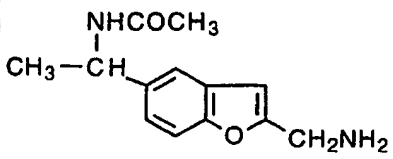
- 273 -

20		Pale red oil	1.57 (2H, s), 2.74 (6H, s), 3.94 (2H, s), 4.78 (2H, s), 6.46 (1H, s), 7.00 (1H, d, J=9 Hz), 7.15-7.32 (5H, m), 7.32 (1H, d, J=9 Hz), 7.41 (1H, s)
21		Pale yellow oil	1.57 (2H, s), 3.95 (3H, s), 4.03 (2H, s), 4.05 (3H, s), 7.53 (1H, s), 7.62 (1H, s), 7.97 (1H, s)
22		White solid	1.35 (3H, t, J=7 Hz), 1.60 (2H, br), 3.99 (2H, s), 4.27 (2H, q, J=7 Hz), 6.41 (1H, d, J=16 Hz), 6.55 (1H, s), 7.40 (2H, m), 7.68 (1H, s), 7.77 (1H, d, J=16 Hz)
23		Pale brown oil	1.00-1.20 (6H, m), 1.58 (2H, br), 3.20-3.45 (4H, m), 3.76 (2H, s), 3.96 (2H, s), 6.47 (1H, s), 7.13 (1H, d, J=8 Hz), 7.37 (2H, d, J=8 Hz), 7.41 (1H, s)
24		Brown oil	1.57 (2H, br), 2.45 (3H, s), 2.69 (3H, s), 3.96 (2H, s), 6.47 (1H, s), 7.10 (1H, d, J=8 Hz), 7.30-7.55 (2H, m)
25		Color - less oil	1.32 (3H, s), 1.57 (2H, br), 2.99 (2H, s), 3.70 - 3.95 (4H, m), 3.96 (2H, s), 6.48 (1H, s), 7.16 (1H, d, J=8 Hz), 7.34 (1H, d, J=8 Hz), 7.41 (1H, s)

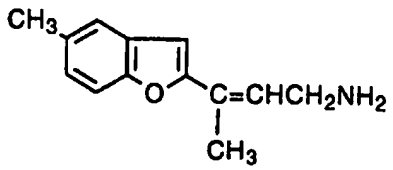
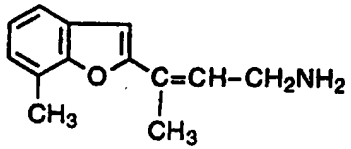
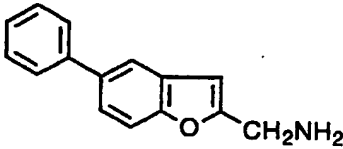
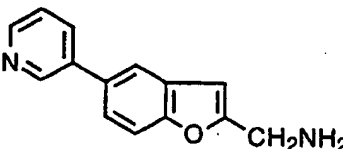
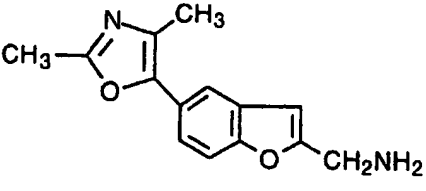
- 274 -

26		White powder	1.60 (2H, br), 3.09 (3H, s), 4.04 (2H, s), 6.67 (1H, s), 7.58 (1H, d, J=9 Hz), 7.84 (1H, d, J=9 Hz), 8.16 (1H, s)
27		White solid	1.57 (2H, br), 2.51 (3H, s), 3.97 (2H, s), 6.47 (1H, s), 7.22 (1H, d, J=9 Hz), 7.35 (1H, d, J=9 Hz), 7.47 (1H, s)
28		Pale yellow powder (HCl)	DMSO-d ₆ : 2.84 (3H, s), 4.24 (4H, s), 7.04 (1H, s), 7.33 (1H, d, J=9 Hz), 7.57 (1H, d, J=9 Hz), 7.64 (1H, s), 8.78 (1H, br)
29		Pale yellow oil	1.54 (2H, br), 1.59 (3H, d, J=8 Hz), 2.07 (3H, s), 4.02 (2H, s), 6.00 (1H, q, J=8 Hz), 7.32 (1H, d, J=10 Hz), 7.45 (1H, d, J=10 Hz), 7.56 (1H, s), 7.60 (1H, s)
30		White powder	1.53 (2H, br), 4.07 (2H, s), 4.41 (3H, s), 7.57 (1H, d, J=9 Hz), 7.62 (1H, s), 8.11 (1H, d, J=9 Hz), 8.41 (1H, s)
31		Pale yellow powder	1.52 (2H, br), 3.95 (3H, s), 4.05 (2H, s), 7.50 (1H, d, J=10 Hz), 7.62 (1H, s), 8.04 (1H, d, J=10 Hz), 8.35 (1H, s)

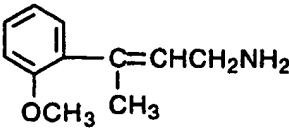
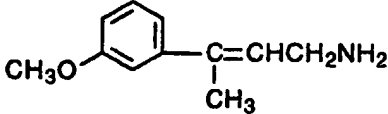
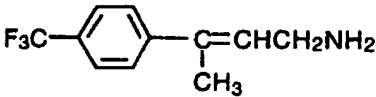
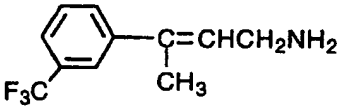
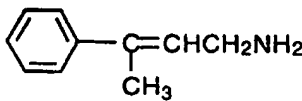
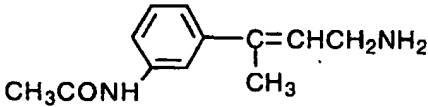
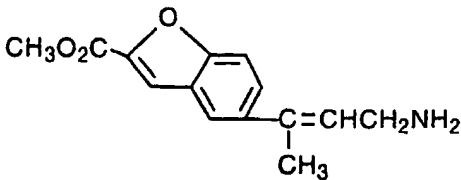
- 275 -

32		Pale yellow oil	0.94 (3H, t, J=7 Hz), 1.50-1.62 (2H, m), 2.40 - 2.60 (2H, m), 3.55 (2H, d, J=7 Hz), 5.70 (1H, t, J=7 Hz), 6.63 (1H, s), 7.17-7.29 (2H, m), 7.40 - 7.56 (2H, m)
33		Pale yellow oil	4.02 (2H, s), 6.61 (1H, s), 7.46-7.63 (4H, m), 7.77-8.01 (3H, m), 8.01 (1H, s)
34		Pale yellow amorphous	0.88 (3H, t, J=7 Hz), 1.80-2.00 (2H, m), 2.07 (3H, s), 3.96 (1H, s), 5.73 (1H, t, J=7 Hz), 6.51 (1H, s), 7.23 (1H, dd, J=8 Hz, 2 Hz), 7.39 (1H, d, J=8 Hz), 7.48 (1H, d, J=2 Hz)
35		Colorless oil	1.47 (3H, d, J=7 Hz), 3.22 (3H, s), 3.96 (2H, s), 4.37 (1H, q, J=7 Hz), 6.51 (1H, s), 7.20 (1H, dd, J=8 Hz, 2 Hz), 7.40 (1H, d, J=8 Hz), 7.45 (1H, d, J=2 Hz)
36		Yellow amorphous	1.53 (3H, d, J=7 Hz), 1.99 (3H, s), 3.96 (2H, s), 5.21 (1H, qui, J=7 Hz), 5.7 (1H, br), 6.65 (1H, s), 7.23 (1H, d, J=8 Hz), 7.40 (1H, d, J=8 Hz), 7.50 (1H, s)

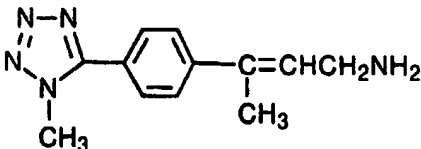
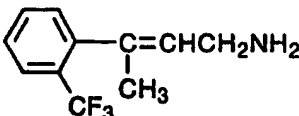
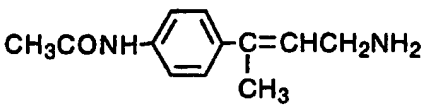
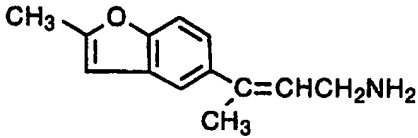
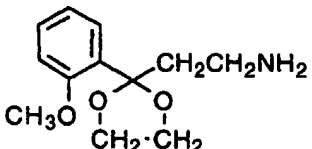
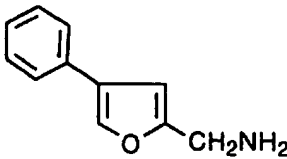
- 276 -

37		Pale yellow oil	2.02 (3H, s), 2.42 (3H, s), 3.53 (2H, d, J=7 Hz), 6.41 (1H, t, J=7 Hz), 6.52 (1H, s), 7.04 (1H, d, J=8 Hz), 7.28 (1H, s), 7.30 (1H, d, J=8 Hz)
38		Pale yellow oil	2.04 (3H, s), 2.52 (3H, s), 3.55 (2H, d, J=7 Hz), 6.47 (1H, t, J=7 Hz), 6.58 (1H, s), 7.04 (1H, d, J=8 Hz), 7.08 (1H, t, J=8 Hz), 7.33 (1H, d, J=8 Hz)
39		Pale yellow powder	3.99 (2H, s), 6.57 (1H, s), 7.30-7.48 (5H, m), 7.59-7.62 (2H, m), 7.71 (1H, s)
40		Pale yellow powder	4.02 (2H, s), 6.60 (1H, s), 7.34-7.55 (3H, m), 7.72 (1H, d, J=5 Hz), 7.90 (1H, d, J=7 Hz), 8.58 (1H, d, J=5 Hz), 8.87 (1H, s)
41		Pale yellow powder	2.39 (3H, s), 2.49 (3H, s), 4.00 (2H, s), 6.56 (1H, s), 7.47 (2H, s), 7.70 (1H, s)

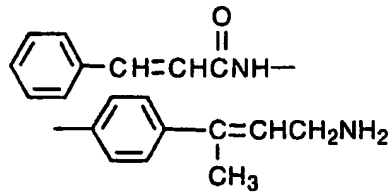
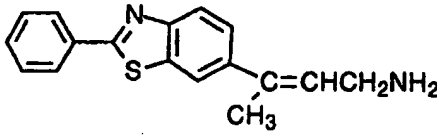
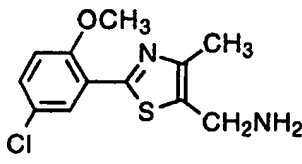
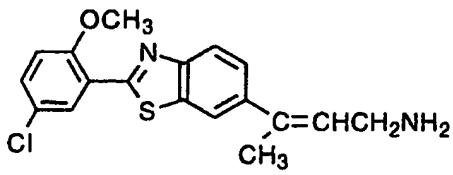
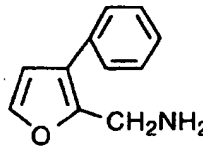
- 277 -

42		Pale yellow oil	2.00 (3H, s), 3.48 (2H, d, J=7 Hz), 3.82 (3H, s), 5.55 (1H, t, J=7 Hz), 6.85 - 6.93 (2H, m), 7.13 (1H, dd, J=8 Hz, 2 Hz), 7.22 (1H, dd, J=8 Hz, 2 Hz)
43		Colorless oil	2.04 (3H, s), 3.49 (2H, d, J=7 Hz), 3.82 (3H, s), 5.86 (1H, t, J=7 Hz), 6.79 (1H, dd, J=8 Hz, 2 Hz), 6.93 (1H, t, J=2 Hz), 6.99 (1H, d, J=8 Hz), 7.23 (1H, t, J=8 Hz)
44		Colorless oil	2.06 (3H, s), 3.52 (2H, d, J=7 Hz), 5.92 (1H, t, J=7 Hz), 7.47-7.61 (4H, m)
45		Colorless oil	2.07 (3H, s), 3.52 (2H, d, J=7 Hz), 5.90 (1H, t, J=7 Hz), 7.39-7.58 (3H, m), 7.63 (1H, s)
46		Colorless oil	2.06 (3H, s), 3.49 (2H, d, J=7 Hz), 5.85 (1H, t, J=7 Hz), 7.21-7.42 (5H, m)
47		Pale yellow oil	2.04 (3H, s), 2.18 (3H, s), 3.48 (2H, d, J=7 Hz), 5.86 (1H, t, J=7 Hz), 7.15 (1H, d, J=8 Hz), 7.26 (1H, t, J=8 Hz), 7.39 (1H, d, J=8 Hz), 7.51 (1H, s), 7.20 (1H, br)
48		Yellow amorphous	DMSO-d ₆ : 2.05 (3H, s), 3.38 (2H, d, J=7 Hz), 3.90 (3H, s), 5.86 (1H, t, J=7 Hz), 7.50 - 7.78 (4H, m)

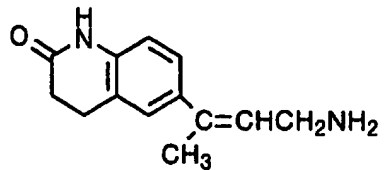
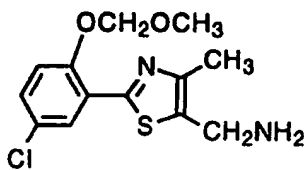
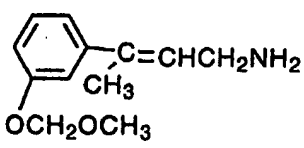
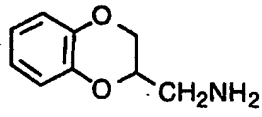
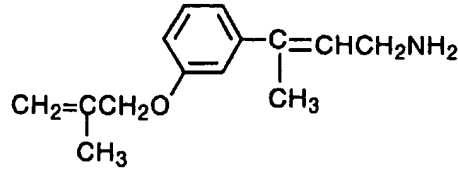
- 278 -

49		White powder	2.09 (3H, s), 3.53 (2H, d, J=7 Hz), 4.40 (3H, s), 5.96 (1H, t, J=7 Hz), 7.53 (2H, d, J=8 Hz), 8.09 (2H, d, J=8 Hz)
50		Colorless oil	1.97 (3H, s), 3.44 (2H, d, J=7 Hz), 5.41 (1H, t, J=7 Hz), 7.22 (1H, d, J=8 Hz), 7.37 (1H, t, J=8 Hz), 7.48 (1H, t, J=8 Hz), 7.63 (1H, d, J=8 Hz)
51		Colorless oil	2.03 (3H, s), 2.17 (3H, s), 3.48 (2H, d, J=7 Hz), 5.83 (1H, d, J=7 Hz), 7.35 (2H, d, J=8 Hz), 7.45 (2H, d, J=8 Hz), 7.30 (1H, br)
52		Colorless oil	2.09 (3H, s), 2.44 (3H, s), 3.50 (2H, d, J=6 Hz), 5.82 (1H, t, J=6 Hz), 6.34 (1H, s), 7.25 (1H, dd, J=8 Hz, 2Hz), 7.32 (1H, d, J=8 Hz), 7.46 (1H, d, J=2 Hz)
53		Colorless oil	2.31 (2H, t, J=7 Hz), 2.72 (2H, t, J=7 Hz), 3.82-3.91 (2H, m), 3.88 (3H, s), 3.98 - 4.07 (2H, m), 6.90 (1H, t, J=8 Hz), 6.93 (1H, t, J=8 Hz), 7.29 (1H, t, J=8 Hz), 7.47 (1H, d, J=8 Hz)
54		Pale yellow needles	3.86 (2H, s), 6.47 (1H, s), 7.20-7.55 (5H, m), 7.64 (1H, s)

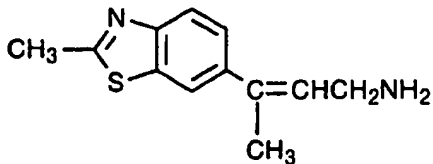
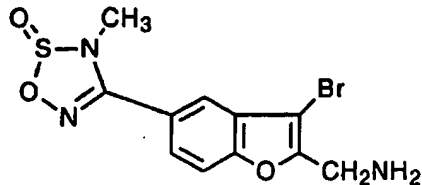
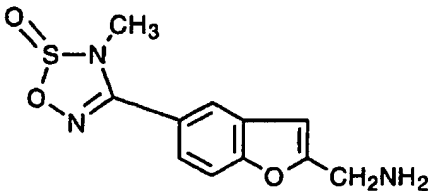
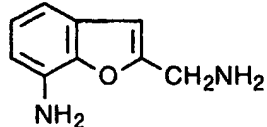
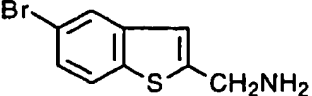
- 279 -

55		Pale yellow oil	2.03 (3H, s), 3.49 (2H, d, J=7 Hz), 5.84 (1H, t, J=7 Hz), 6.59 (1H, d, J=16Hz), 7.35-7.68 (10H, m), 7.75 (1H, d, J=16 Hz)
56		Yellow solid	2.14 (3H, s), 3.54 (2H, d, J=7 Hz), 5.96 (1H, t, J=7 Hz), 7.45-7.60 (4H, m), 7.91 (1H, d, J=2 Hz), 8.00 (1H, d, J=8 Hz), 8.07-8.11 (2H, m)
57		Pale yellow powder	2.43 (3H, s), 3.99 (3H, s), 4.05 (2H, s), 6.93 (1H, d, J=8 Hz), 7.28 (1H, dd, J=8 Hz, 3 Hz), 8.32 (1H, d, J=3 Hz)
58		Yellow amorphous	2.14 (3H, s), 3.54 (2H, d, J=7 Hz), 4.06 (3H, s), 5.96 (1H, t, J=7 Hz), 7.00 (1H, d, J=8 Hz), 7.39 (1H, dd, J=8 Hz, 3 Hz), 7.57 (1H, dd, J=8 Hz, 2 Hz), 7.92 (1H, d, J=2 Hz), 8.01 (1H, d, J=8 Hz), 8.53 (1H, d, J=3 Hz)
59		Brown oil	3.97 (2H, s), 6.52 (1H, d, J=2 Hz), 7.25-7.55 (6H, m)

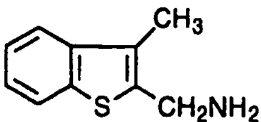
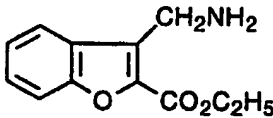
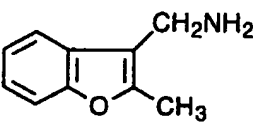
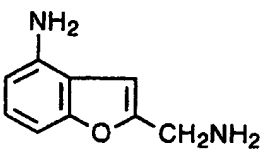
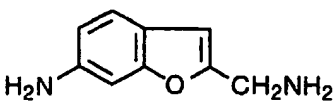
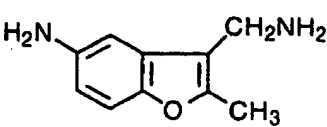
- 280 -

60		Yellow amorphous	2.06 (3H, s), 2.65 (2H, t, J=7 Hz), 2.98 (2H, t, J=7 Hz), 3.53 (2H, d, J=7 Hz), 5.94 (1H, t, J=7 Hz), 6.72 (1H, d, J=8 Hz), 7.23 (2H, m), 8.06 (1H, br)
61		Yellow oil	2.44 (3H, s), 3.52 (3H, s), 4.06 (2H, s), 5.35 (2H, s), 7.17 (1H, d, J=8 Hz), 7.26 (1H, dd, J=8 Hz, 2 Hz), 8.34 (1H, d, J=2 Hz)
62		Colorless oil	2.04 (3H, s), 3.48 (2H, d, J=7 Hz), 3.49 (3H, s), 5.19 (2H, s), 5.86 (1H, t, J=7 Hz), 6.93 (1H, dd, J=8 Hz, 3 Hz), 7.05 (1H, dd, J=8 Hz, 3 Hz), 6.95 (1H, s), 7.23 (1H, t, J=8 Hz)
63		Colorless oil	2.98 (2H, dd, J=6 Hz, 2Hz), 4.01 (1H, dd, J=11 Hz, 7 Hz), 4.13 (1H, m), 4.27 (1H, dd, J=11 Hz, 2 Hz), 6.81 - 6.92 (4H, m)
65		Colorless oil	1.84 (3H, s), 2.04 (3H, s), 3.49 (2H, d, J=7 Hz), 4.44 (2H, s), 4.99 (1H, s), 5.10 (1H, s), 6.82 (1H, d, J=8 Hz), 6.97 (1H, s), 6.99 (1H, d, J=8 Hz), 5.86 (1H, t, J=7 Hz), 7.22 (1H, t, J=8 Hz)

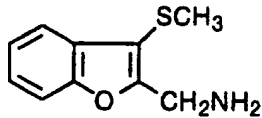
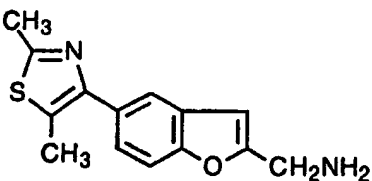
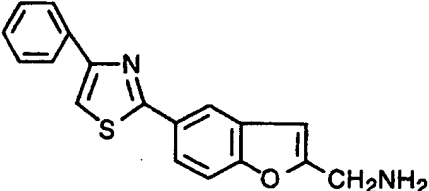
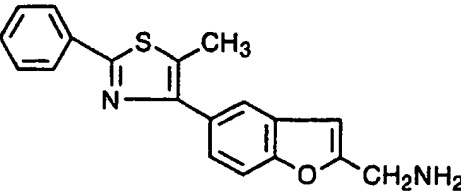
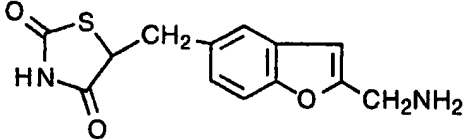
- 281 -

66		Colorless amorphous	2.11 (3H, s), 2.83 (3H, s), 3.52 (2H, d, J=7 Hz), 5.91 (1H, t, J=7 Hz), 7.50 (1H, dd, J=8 Hz, 2Hz), 7.82 (1H, d, J=2 Hz), 7.87 (1H, d, J=8 Hz)
67		Pale yellow oil	3.41 (3H, s), 3.96 (2H, s), 7.06 (1H, d, J=2 Hz), 7.14 (1H, dd, J=8 Hz, 2 Hz), 7.43 (1H, d, J=8 Hz)
68		Pale yellow oil	3.35 (3H, s), 3.97 (2H, s), 6.68 (1H, s), 7.03 (1H, dd, J=8 Hz, 2 Hz), 7.17 (1H, d, J=2 Hz), 7.41 (1H, d, J=8 Hz)
69		Yellow powder	1.59 (2H, brs), 3.92 (2H, brs), 3.96 (2H, s), 6.48 (1H, s), 6.61 (1H, d, J=7 Hz), 6.9-7.1 (2H, m)
70		Yellow powder	1.61 (2H, brs), 4.14 (2H, s), 7.06 (1H, s), 7.37 (1H, d, J=8 Hz), 7.64 (1H, d, J=8 Hz), 7.82 (1H, s)

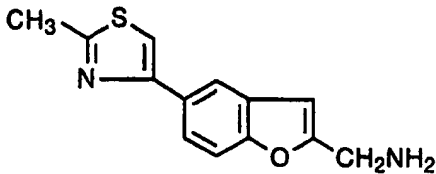
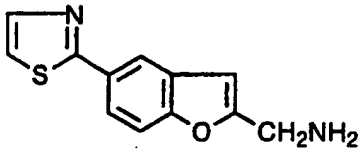
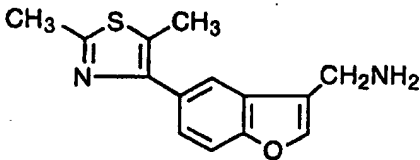
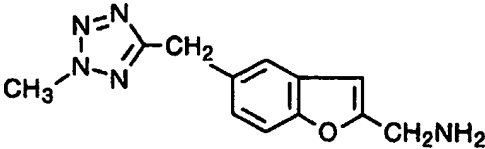
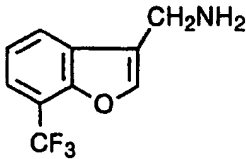
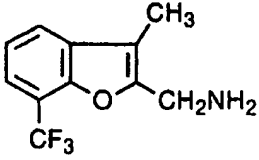
- 282 -

71		Yellow powder	1.51 (2H, brs), 2.34 (3H, s), 4.09 (2H, s), 7.2-7.4 (2H, m), 7.63 (1H, d, J=8 Hz), 7.79 (1H, d, J=8 Hz)
72		Yellow oil	1.46 (3H, t, J=7 Hz), 1.68 (2H, brs), 4.25 (2H, s), 4.48 (2H, q, J=7 Hz), 7.3-7.5 (2H, m), 7.58 (1H, d, J=8 Hz), 7.77 (1H, d, J=8 Hz)
73		Pale yellow oil	1.46 (2H, brs), 2.44 (3H, s), 3.91 (2H, s), 7.1-7.3 (2H, m), 7.3-7.4 (1H, m), 7.5-7.6 (1H, m)
74		Yellow powder	1.53 (2H, brs), 3.87 (2H, brs), 3.95 (2H, s), 6.45 (1H, s), 6.49 (1H, d, J=8 Hz), 6.90 (1H, d, J=8 Hz), 7.05 (1H, dd, J=8 Hz, 8 Hz)
75		Yellow powder	1.54 (2H, brs), 3.71 (2H, brs), 3.90 (2H, s), 6.38 (1H, s), 6.60 (1H, d, J=8 Hz), 6.77 (1H, s), 7.26 (1H, d, J=8 Hz)
76		Orange powder	1.44 (2H, brs), 2.38 (3H, s), 3.56 (2H, brs), 3.83 (2H, s), 6.59 (1H, d, J=8 Hz), 6.83 (1H, s), 7.17 (1H, d, J=8 Hz)

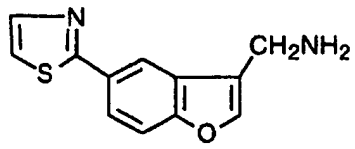
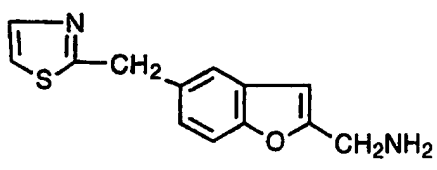
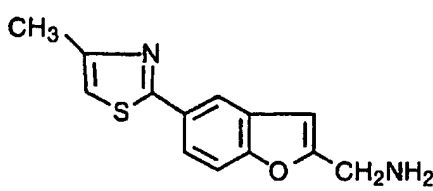
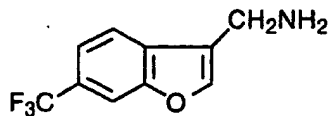
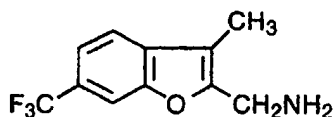
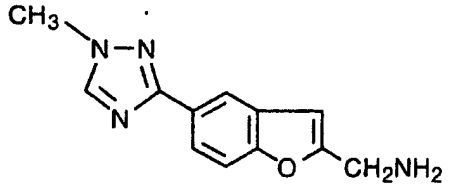
- 283 -

77		Orange oil	1.57 (2H, brs), 2.35 (3H, s), 4.10 (2H, s), 7.2-7.3 (2H, m), 7.4-7.5 (1H, m), 7.6-7.7 (1H, m)
78		White powder	1.64 (2H, brs), 2.52 (3H, s), 2.69 (3H, s), 3.99 (2H, s), 6.55 (1H, s), 7.4-7.6 (2H, m), 7.74 (1H, s)
79		Orange powder	1.59 (2H, brs), 4.00 (2H, s), 6.60 (1H, s), 7.3-7.5 (5H, m), 7.9-8.1 (3H, m), 8.22 (1H, s)
80		White powder	1.61 (2H, brs), 2.61 (3H, s), 4.00 (2H, s), 6.58 (1H, s), 7.3-7.6 (4H, m), 7.61 (1H, d, J=8 Hz), 7.85 (1H, s), 7.9 - 8.0 (2H, m)
81		Brown powder	DMSO-d ₆ : 3.0-3.1 (1H, m), 3.4-3.6 (1H, m), 4.09 (2H, s), 4.7 - 4.8 (1H, m), 6.85 (1H, s), 7.18 (1H, d, J=9 Hz), 7.4 - 7.6 (2H, m)

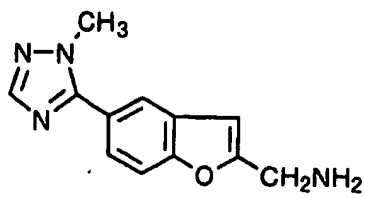
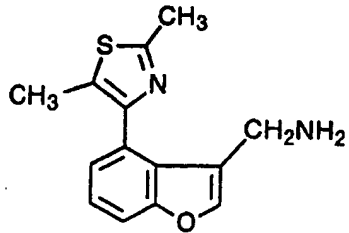
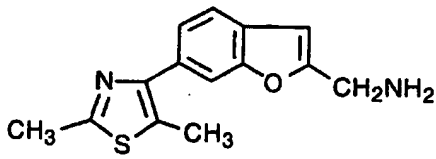
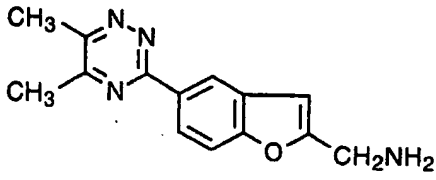
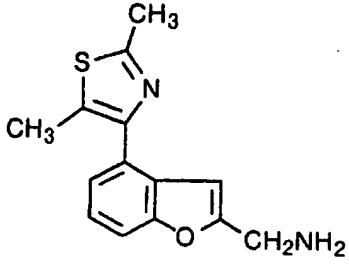
- 284 -

82		Yellow oil	1.58 (2H, brs), 2.79 (3H, s), 3.99 (2H, s), 6.56 (1H, s), 7.26 (1H, s), 7.45 (1H, d, J=8 Hz), 7.75 (1H, d, J=8 Hz), 8.06 (1H, s)
83		Brown powder	1.53 (2H, brs), 4.00 (2H, s), 6.59 (1H, s), 7.30 (1H, d, J=3 Hz), 7.48 (1H, d, J=9 Hz), 7.8-7.9 (2H, m), 8.14 (1H, s)
84		Yellow oil	1.56 (2H, brs), 2.52 (3H, s), 2.70 (3H, s), 4.03 (2H, s), 7.4-7.6 (3H, m), 7.85 (1H, s)
85		Yellow oil	1.57 (2H, brs), 3.95 (2H, s), 4.29 (3H, s), 4.30 (2H, s), 6.47 (1H, s), 7.21 (1H, d, J=8 Hz), 7.36 (1H, d, J=8 Hz), 7.46 (1H, s)
86		Yellow oil	1.49 (2H, brs), 4.05 (2H, s), 7.33 (1H, dd, J=8 Hz, 8 Hz), 7.56 (1H, d, J=8 Hz), 7.66 (1H, s), 7.81 (1H, d, J=8 Hz)
87		Yellow oil	1.61 (2H, brs), 2.24 (3H, s), 3.97 (2H, s), 7.28 (1H, dd, J=8 Hz, 8 Hz), 7.49 (1H, d, J=8 Hz), 7.63 (1H, d, J=8 Hz)

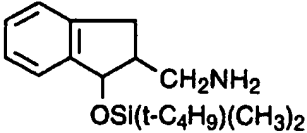
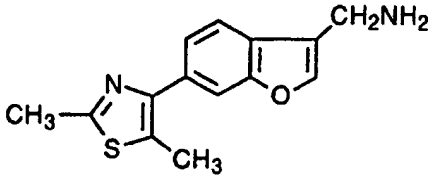
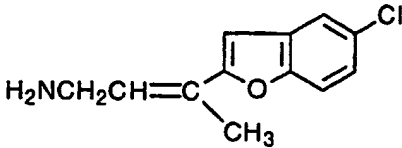
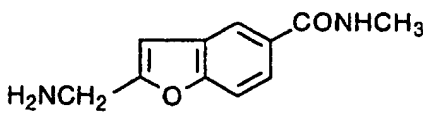
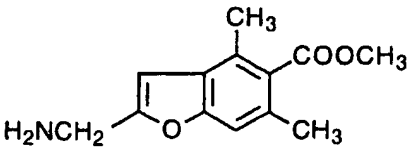
- 285 -

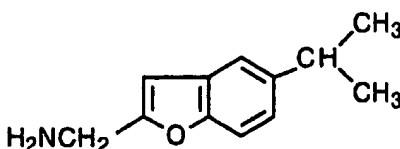
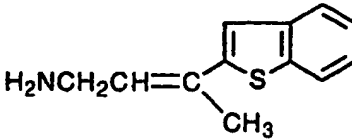
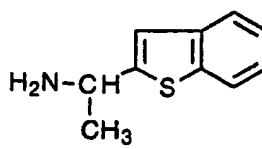
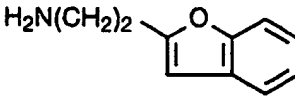
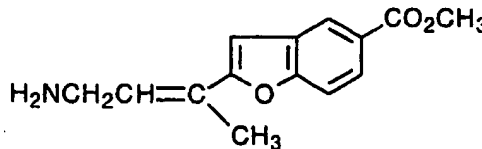
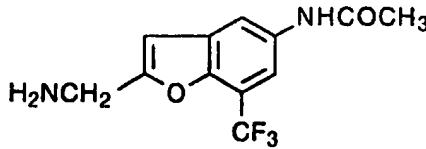
88		Yellow powder	1.45 (2H, brs), 4.06 (2H, s), 7.32 (1H, d, J=3 Hz), 7.52 (1H, d, J=9 Hz), 7.60 (1H, s), 7.8-8.0 (2H, m), 8.24 (1H, s)
89		Yellow powder	1.57 (2H, brs), 3.96 (2H, s), 4.42 (2H, s), 6.49 (1H, s), 7.1-7.3 (2H, m), 7.49 (1H, d, J=8 Hz), 7.46 (1H, s), 7.70 (1H, d, J=3 Hz)
90		Yellow powder	1.54 (2H, brs), 2.51 (3H, s), 3.99 (2H, s), 6.57 (1H, s), 6.84 (1H, s), 7.45 (1H, d, J=9 Hz), 7.83 (1H, d, J=9 Hz), 8.11 (1H, s)
91		Yellow oil	1.53 (2H, brs), 4.05 (2H, s), 7.52 (1H, d, J=8 Hz), 7.6 - 7.8 (3H, m)
92		Yellow powder	1.56 (2H, brs), 2.24 (3H, s), 3.97 (2H, s), 7.4-7.6 (2H, m), 7.67 (1H, s)
93		Yellow powder	1.54 (2H, brs), 3.97 (3H, s), 3.98 (2H, s), 6.58 (1H, s), 7.48 (1H, d, J=9 Hz), 8.01 (1H, d, J=9 Hz), 8.05 (1H, s), 8.26 (1H, s)

- 286 -

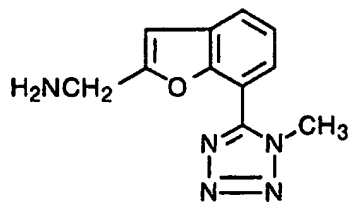
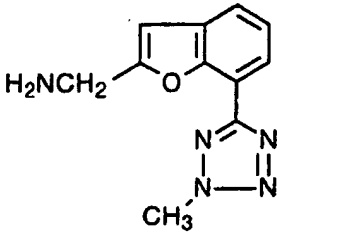
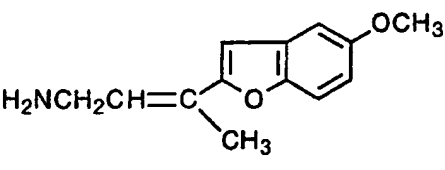
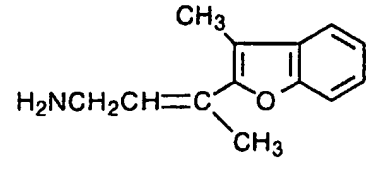
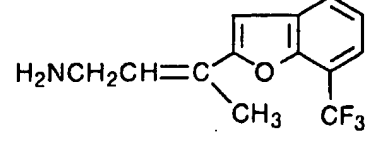
94		Yellow powder	1.61 (2H, brs), 4.01 (3H, s), 4.02 (2H, s), 6.62 (1H, s), 7.5-7.6 (2H, m), 7.83 (1H, s), 7.95 (1H, s)
95		Brown oil	1.37 (2H, brs), 2.34 (3H, s), 2.71 (3H, s), 3.54 (2H, s), 7.15 (1H, d, J=7 Hz), 7.33 (1H, dd, J=7 Hz, 8 Hz), 7.50 (1H, d, J=8 Hz), 7.55 (1H, s)
96		Yellow oil	1.54 (2H, brs), 2.54 (3H, s), 2.69 (3H, s), 3.99 (2H, s), 6.54 (1H, s), 7.4-7.6 (2H, m), 7.67 (1H, s)
97		Pale yellow powder	1.54 (2H, brs), 2.61 (3H, s), 2.72 (3H, s), 4.01 (2H, s), 6.63 (1H, s), 7.54 (1H, d, J=9 Hz), 8.46 (1H, d, J=9 Hz), 8.70 (1H, s)
98		Yellow oil	1.49 (2H, brs), 2.47 (3H, s), 2.71 (3H, s), 3.97 (2H, s), 6.69 (1H, s), 7.2-7.5 (3H, m)

- 287 -

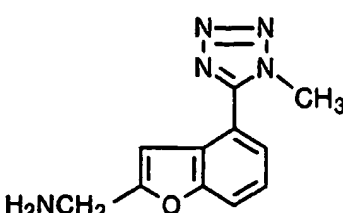
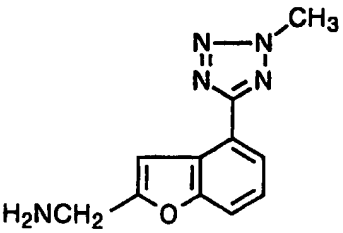
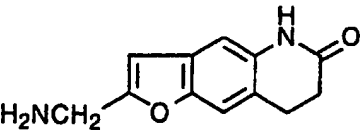
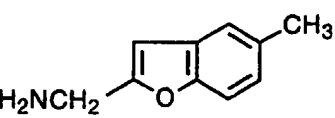
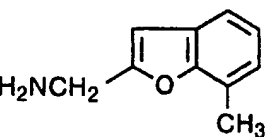
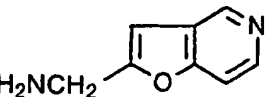
99		Yellow oil	0.16 (3H, s), 0.20 (3H, s), 0.95 (9H, s), 1.61 (2H, brs), 2.3-2.4 (1H, m), 2.5-2.6 (1H, m), 2.7 - 2.9 (1H, m), 3.0-3.2 (2H, m), 4.94 (1H, d, J=7 Hz), 7.1-7.3 (4H, m)
100		Yellow oil	1.50 (2H, brs), 2.54 (3H, s), 2.70 (3H, s), 4.04 (2H, s), 7.5-7.7 (3H, m), 7.73 (1H, s)
101		White powder	2.17 (3H, s), 3.88 (2H, d, J=6.8 Hz), 6.51 (1H, t, J=6.8 Hz), 6.63 (1H, s), 7.20 (1H, d, J=8.7 Hz), 7.33 (1H, d, J=8.7 Hz), 7.49 (1H, s)
102		Yellow oil	2.97 (3H, s), 4.00 (2H, brs), 6.27 (1H, brs), 7.42 (1H, brd, J=8 Hz), 7.65 (1H, brs), 7.76 (1H, brd, J=8 Hz), 8.05 (1H, brs)
103		Yellow oil	2.39 (3H, s), 2.42 (3H, s), 3.92 (3H, s), 4.05 (2H, s), 6.65 (1H, s), 7.12 (1H, s)

104		Pale yellow oil	1.27 (6H, d, J=6.9 Hz), 2.99 (1H, sept. J=6.9 Hz), 3.99 (2H, s), 6.52 (1H, s), 7.12 (1H, d, J=8.7 Hz), 7.34 (1H, d, J=8.7 Hz), 7.36 (1H, s)
105		Yellow oil	2.13 (3H, brs), 3.53 (2H, d, J=6.6 Hz), 6.10 (1H, t, J=6.6 Hz), 7.19 (1H, s), 7.2-7.4 (2H, m), 7.6-7.8 (2H, m)
106		Yellow oil	1.55 (3H, d, J=7.4 Hz), 4.44 (1H, q, J=7.4 Hz), 7.13 (1H, s), 7.2-7.4 (2H, m), 7.68 (1H, d, J=7.3 Hz), 7.80 (1H, d, J=7.3 Hz)
107		Yellow oil	2.92 (2H, t, J=6.5 Hz), 3.10 (2H, t, J=6.5 Hz), 6.46 (1H, s), 7.1-7.3 (2H, m), 7.4-7.6 (2H, m)
108		Yellow oil	2.19 (3H, s), 3.91 (2H, d, J=6.5 Hz), 3.94 (3H, s), 6.54 (1H, t, J=6.5 Hz), 6.74 (1H, s), 7.43 (1H, d, J=8.6 Hz), 8.00 (1H, d, J=8.6 Hz), 8.27 (1H, s)
109		Yellow oil	2.21 (3H, s), 4.01 (2H, s), 6.59 (1H, s), 7.42 (1H, s), 8.06 (1H, s)

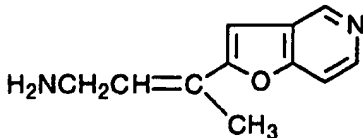
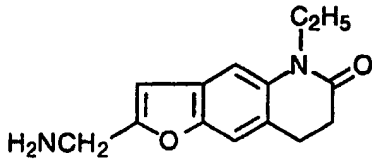
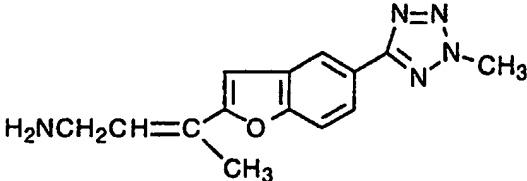
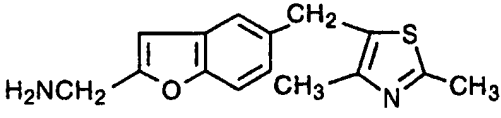
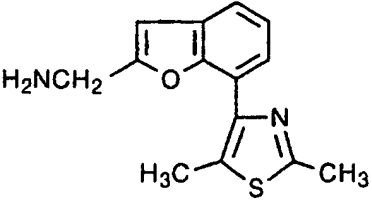
- 289 -

110		Yellow oil	4.02 (2H, s), 4.15 (3H, s), 6.69 (1H, s), 7.40 (1H, t, J=8.1 Hz), 7.58 (1H, d, J=8.1 Hz), 7.76 (1H, d, J=8.1 Hz)
111		Yellow oil	4.10 (2H, s), 4.49 (3H, s), 6.64 (1H, s), 7.34 (1H, t, J=7.7 Hz), 7.65 (1H, d, J=7.7 Hz), 8.05 (1H, d, J=7.7 Hz)
112		Pale yellow powder	2.02 (3H, brs), 3.54 (2H, d, J=6.8 Hz), 3.84 (3H, s), 6.41 (1H, t, J=6.8 Hz), 6.54 (1H, s), 6.84 (1H, dd, J=8.8 Hz, 2.5 Hz), 6.98 (1H, d, J=2.5 Hz), 7.30 (1H, d, J=8.8 Hz)
113		Yellow oil	2.12 (3H, brs), 2.35 (3H, s), 3.55 (2H, d, J=6.7 Hz), 6.11 (1H, t, J=6.7 Hz), 7.2-7.3 (2H, m), 7.4-7.5 (2H, m)
114		Yellow oil	2.05 (3H, brs), 3.56 (2H, d, J=7.1 Hz), 6.53 (1H, t, J=7.1 Hz), 6.64 (1H, s), 7.25 (1H, t, J=6.9 Hz), 7.48 (1H, d, J=6.9 Hz), 7.68 (1H, d, J=6.9 Hz)

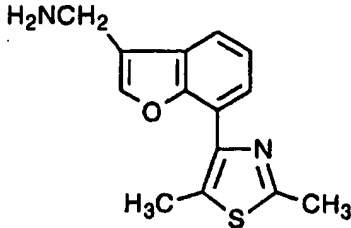
- 290 -

115		Yellow oil	4.03 (2H, s), 4.20 (3H, s), 6.69 (1H, s), 7.4-7.5 (2H, m), 7.6-7.7 (1H, m)
116		Yellow oil	4.05 (2H, s), 4.45 (3H, s), 7.33 (1H, s), 7.37 (1H, t, J=7.6 Hz), 7.55 (1H, d, J=7.6 Hz), 8.06 (1H, d, J=7.6 Hz)
117		Yellow oil	2.44 (2H, t, J=7.5 Hz), 2.96 (2H, t, J=7.5 Hz), 4.00 (2H, s), 6.68 (1H, s), 7.00 (1H, s), 7.37 (1H, s), 10.11 (1H, s)
118		Yellow oil	2.42 (3H, s), 3.95 (2H, s), 6.45 (1H, s), 7.0-7.2 (1H, m), 7.3-7.5 (2H, m)
119		Yellow oil	2.51 (3H, s), 3.98 (2H, s), 6.51 (1H, s), 7.06 (1H, d, J=7.3 Hz), 7.10 (1H, t, J=7.3 Hz), 7.34 (1H, d, J=7.3 Hz)
120		Yellow oil	4.02 (2H, s), 6.61 (1H, s), 7.39 (1H, d, J=5.7 Hz), 8.46 (1H, d, J=5.7 Hz), 8.86 (1H, s)

- 291 -

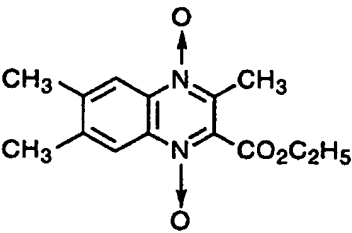
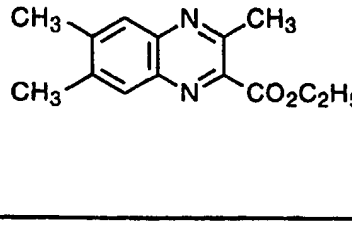
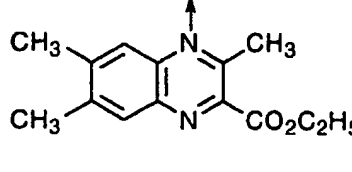
121	 <chem>CC(C)C=CNC</chem>	Yellow oil	2.05 (3H, s), 3.56 (2H, d, J=6.6 Hz), 6.50 (1H, t, J=6.6 Hz), 6.64 (1H, s), 7.37 (1H, d, J=5.7 Hz), 8.45 (1H, d, J=5.7 Hz), 8.84 (1H, s)
122	 <chem>CCN1CCCC(=O)N1c2ccc3c(c2)oc(CN)cc3</chem>	Yellow oil	1.29 (3H, t, J=7.1 Hz), 2.64 (2H, t, J=8.2 Hz), 2.97 (2H, t, J=8.2 Hz), 4.04 (2H, q, J=7.1 Hz), 4.12 (2H, s), 6.71 (1H, s), 7.16 (1H, s), 7.27 (1H, s)
123	 <chem>CC(C)C=CNCc1ccc2c(c1)oc(C=C3N=NN(C)C3)cc2</chem>	Yellow oil	2.21 (3H, s), 3.91 (2H, d, J=6.6 Hz), 4.41 (3H, s), 6.54 (1H, t, J=6.6 Hz), 6.76 (1H, s), 7.52 (1H, d, J=8.5 Hz), 8.06 (1H, d, J=8.5 Hz), 8.33 (1H, s)
124	 <chem>CC(C)C=CNCc1ccc2c(c1)oc(C=C3C=NC(C)=S3)cc2</chem>	Yellow oil	2.39 (3H, s), 2.61 (3H, s), 3.98 (2H, s), 4.12 (2H, s), 6.47 (1H, s), 7.07 (1H, d, J=8.4 Hz), 7.30 (1H, s), 7.47 (1H, d, J=8.4 Hz)
125	 <chem>CC(C)C=CNCc1ccc2c(c1)oc(C=C3C=NC(C)=S3)cc2</chem>	Yellow oil	2.41 (3H, s), 2.72 (3H, s), 3.97 (2H, s), 6.58 (1H, s), 7.3-7.7 (3H, m)

- 292 -

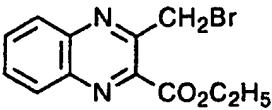
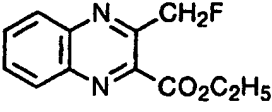
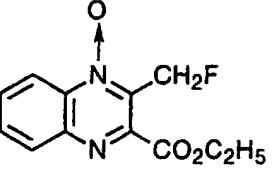
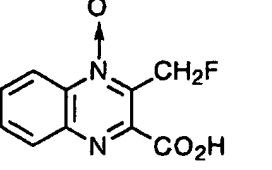
126		Yellow oil	2.41 (3H, s), 2.72 (3H, s), 4.04 (2H, s), 7.3-7.7 (4H, m)
-----	---	------------	---

Using the suitable starting compounds, there are obtained the compounds as listed in Table 4 in the same manner as in Reference Examples 15-21.

Table 4

No.	Structure	m.p. °C	Crystalline Form	¹ H-NMR (CDCl ₃) δ ppm:
1			Yellow powder	1.47 (3H, t, J=7 Hz), 2.51 (3H, s), 2.53 (3H, s), 2.57 (3H, s), 4.58 (2H, q, J=7 Hz), 8.31 (1H, s), 8.36 (1H, s)
2			Orange powder	1.49 (3H, t, J=7 Hz), 2.48 (3H, s), 2.50 (3H, s), 2.93 (3H, s), 4.55 (2H, q, J=7 Hz), 7.78 (1H, s), 7.91 (1H, s)
3			Pale yellow powder	1.48 (3H, t, J=7 Hz), 2.48 (3H, s), 2.53 (3H, s), 2.80 (3H, s), 4.54 (2H, q, J=7 Hz), 7.93 (1H, s), 8.34 (1H, s)

- 293 -

No.	Structure	m.p. °C	Crystalline Form (solvent for recrystal.)
4		83-95	Colorless needles (dichloro- methane/ n-hexane) NMR analysis: *
5		96-97	White powder (dichloromethane/ n-hexane)
6		109-110	Colorless flakes (dichloromethane/ n-hexane)
7		140-141	Brown powder (chloroform)

*: ¹H-NMR (CDCl₃) ppm:

1.53 (3H, t, J=7 Hz), 4.61 (2H, d, J=7 Hz), 5.14 (2H, s), 7.81-7.93 (2H, m),
8.11 (1H, m), 8.23 (1H, m)

- 294 -

Example 1

2-Ethoxycarbonyl-3-methylquinoxalin-4-oxide (1.5 g) is mixed with 3-aminomethylbenzofuran (1.9 g) under nitrogen atmosphere, and the mixture is stirred at 60°C overnight. The reaction mixture is purified by silica gel column chromatography (solvent; n-hexane : ethyl acetate = 3 : 1), and recrystallized from ethanol to give 2-[(3-benzofuranyl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (1.3 g) as colorless needles.

M.p. 143-144°C

Example 2

2-Carboxy-3-methylquinoxalin-4-oxide (0.8 g) and 2-aminomethyl-5-dimethylaminobenzofuran (0.9 g) are dissolved in dimethylformamide (10 ml), and thereto are added dropwise successively diethyl cyanophosphate (0.8 g) and triethylamine (0.8 g) under ice-cooling. The mixture is stirred at room temperature overnight, extracted with ethyl acetate, and washed with water. The mixture is dried over anhydrous sodium sulfate, and evaporated to remove the solvent. The residue is purified by silica gel column chromatography (solvent; n-hexane : ethyl acetate = 1 : 1), and recrystallized from acetonitrile to give 2-[(5-dimethylamino-2-benzofuranyl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.6 g) as yellow plates.

M.p. 155-157°C

Example 3

2-Quinoxalinecarboxylic acid (0.5 g) is dissolved in dichloromethane (10 ml), and thereto is added dicyclohexylcarbodiimide (0.7 g). The mixture is stirred for 30 minutes, and thereto is added 2-aminomethylbenzofuran (0.5 g), and the mixture is stirred overnight. The insoluble materials are removed by filtration, and the organic layer is washed with saturated sodium hydrogen carbonate solution and water, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; n-hexane : ethyl acetate = 3 : 1), and recrystallized from n-hexane/ethyl acetate to give 2-[(2-benzofuranyl)methylaminocarbonyl]quinoxaline (0.43 g) as colorless flakes.

M.p. 155-156°C

- 295 -

Example 4

2-[(4-Morpholinocarbonylmethoxybenzyl)aminocarbonyl]-3-methylquinoxaline (2.2 g) is dissolved in methylene chloride (30 ml), and thereto is added m-chloroperbenzoic acid (1.3 g) at room temperature, and the mixture is stirred for one day. To the mixture is added chloroform, and the organic layer is washed successively with aqueous sodium thiosulfate solution, saturated aqueous sodium hydrogen carbonate solution, and water, and dried over anhydrous sodium sulfate. The mixture is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; ethyl acetate), and recrystallized from acetonitrile to give 2-[(4-morpholinocarbonylmethoxybenzyl)aminocarbonyl]-3-methylquinoxalin-4-oxide (1.5 g) as colorless needles.

M.p. 142-143°C

Using the suitable starting compounds, there are obtained the compounds of Examples 28-103, 125, 126, 128, 130-135, 137, 138, 141, 143-146, 148, 150, 152, 154-157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177-184, 187-189, 191, 192, 194, 196-201, 203-205, 207, 209-213, 216, 219, 220, 224, 226, 228-230, 233, 235, 236, 239, 240 and the following Examples 435-440, 442-479 and 484-487 in the same manner as in Example 4.

Example 5

2-Cinnamylaminocarbonyl-3-methylquinoxaline (1.0 g) is dissolved in dimethylformamide (15 ml), and thereto is added sodium hydride (160 mg) under ice-cooling. The mixture is stirred at the same temperature for 30 minutes, and thereto is added methyl iodide (0.52 g), and the mixture is stirred at room temperature for two hours. The mixture is poured into ice-water, and extracted with diethyl ether. The extract is washed with water, dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; n-hexane : ethyl acetate = 2 : 1) to give 2-(N-cinnamyl-N-methylaminocarbonyl)-3-methylquinoxaline (0.8 g) as pale yellow liquid.

¹H-NMR (CDCl₃) δ ppm: 2.78, 2.79 (3H, s), 2.92, 3.24 (3H, s), 3.98, 4.43 (2H, d, J=6 Hz), 6.10-6.40 (1H, m), 6.40, 6.70 (1H, d, J=16 Hz), 7.20-7.50 (5H,

- 296 -

m), 7.70-7.85 (2H, m), 8.00-8.15 (2H, m)

Using the suitable starting compounds, there are obtained the compounds of Examples 44, 66, 107, 110, 135, 138, 150, 151, 152, 153, 175, 176, 178, 186, 187, 191 and 192 in the same manner as in Example 5.

5

Example 6

2-[(5-Aminobenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.4 g) is suspended in pyridine (6 ml), and thereto is added dropwise with stirring acetic anhydride (0.26 g) under ice-cooling. The mixture is stirred at room temperature for one day, and poured into ice-water.

10 The precipitated crystals are collected by filtration, washed with water, and the resulting crude crystals are recrystallized from acetonitrile to give 2-[(5-acetylaminobenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.4 g) as pale yellow needles.

M.p. 183-184°C

15

Using the suitable starting compounds, there are obtained the compounds of Examples 84 and 85 in the same manner as in Example 6.

Example 7

20 2-[(5-Aminobenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.8 g) is dissolved in dimethylformamide (15 ml), and thereto are added potassium carbonate (0.5 g) and N-chloroacetylmorpholine (0.37 g). The mixture is stirred at 70°C for four hours, and evaporated to remove the solvent. To the residue is added water, and the mixture is extracted with chloroform, washed with water, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified
25 by silica gel column chromatography (solvent; ethyl acetate), to convert the resultant to an oxalate thereof, and recrystallized from ethanol to give 2-[(5-morpholinocarbonylmethylaminobenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (40 mg) as pale brown granules.

M.p. 159-167°C (decomposed)

30

¹H-NMR (CDCl₃) δ ppm: 3.09 (3H, s), 3.40-3.55 (2H, m), 3.55-3.85 (6H, m), 3.90 (2H, s), 4.78 (2H, d, J=6 Hz), 6.60 (1H, s), 6.65 (1H, d, J=7 Hz), 6.67 (1H, s), 7.28 (1H, d, J=7 Hz), 7.75-7.85 (2H, m), 8.05-8.15 (1H, m), 8.47 (1H,

- 297 -

brs), 8.50-8.60 (1H, m)

Example 8

2-[(5-Ethoxycarbonylbenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (4.2 g) is added to a solution of sodium hydroxide (1.4 g) in methanol (50 ml) and water (14 ml), and the mixture is stirred at room temperature overnight. The mixture is evaporated to remove methanol, and to the resultant is added water and acidified with hydrochloric acid, and the precipitated crystals are collected by filtration, washed with water, and dried to give 2-[(5-carboxybenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (3.8 g) as white powder.

M.p. 251-252°C (decomposed)

Example 9

2-[(6-Methoxymethoxy-3-methylbenzofuran-2-yl)methylamino-carbonyl]-3-methylquinoxalin-4-oxide (2.1 g) is dissolved in tetrahydrofuran (20 ml) and methanol (20 ml), and to the mixture is added 6N hydrochloric acid (10 ml), and the mixture is refluxed for one hour. The mixture is evaporated to remove the solvent, and the residue is extracted with chloroform. The extract is washed with saturated aqueous sodium hydrogen carbonate solution, water and brine, and dried over anhydrous sodium sulfate. The solvent is evaporated to remove the solvent, and the residue is recrystallized from dimethyl-formamide/water to give 2-[(6-hydroxy-3-methylbenzofuran-2-yl)methylamino-carbonyl]-3-methylquinoxalin-4-oxide (1.6 g) give as yellow needles.

M.p. 222-223°C (decomposed)

Example 10

2-[(4-Hydroxy-3-methylbenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.55 g) is dissolved in dimethylformamide (4 ml), and to the mixture are added potassium carbonate (0.41 g) and methyl iodide (0.19 ml), and the mixture is stirred at 60°C for four hours. To the mixture is added water, and the precipitated crystals are collected by filtration, and washed with water. The crude crystals are recrystallized from ethyl acetate/n-hexane to give 2-[(4-methoxy-3-methylbenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.41 g) as yellow prisms.

M.p. 196-197°C

- 298 -

Example 11

2-[(Benzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4 -
oxide (0.8 g) is dissolved in chloroform (10 ml), and thereto is added N -
bromosuccinimide (0.47 g), and the mixture is refluxed for 7 hours. The mixture
5 is evaporated to remove the solvent, and the residue is purified by silica gel
column chromatography (solvent; n-hexane : ethyl acetate = 2 : 1), and
recrystallized from ethyl acetate/n-hexane to give 2-[(3-bromobenzofuran-2 -
yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.44 g) as colorless
needles.

10 M.p. 170-171°C

Using the suitable starting compounds, there are obtained the
compounds of Examples 31, 34, 38, 88, 93, 98, 119, 124, 125, 131 and 139 in
the same manner as in Example 11.

Example 12

15 2-[(4-Methoxybenzyl)aminocarbonyl]-3-methylquinoxaline (10.5
g) is dissolved in dry methylene chloride (150 ml), and thereto is added
dropwise a 1M solution of boron tribromide in methylene chloride (105 ml)
under ice-cooling. The mixture is stirred at room temperature for two days,
cooled, decomposed with methanol, and evaporated to remove the solvent. To
20 the residue is added water, and the mixture is neutralized with sodium
hydrogen carbonate, and the precipitated crystals are collected by filtration,
washed with water, and dried. The residue is recrystallized from ethanol to
give 2-[(4-hydroxybenzyl)aminocarbonyl]-3-methylquinoxaline (10.0 g) as
colorless needles.

25 M.p. 211-214°C

Example 13

2-[[5-(1-Acetoxyethyl)benzofuran-2-yl]methylaminocarbonyl]-3 -
methylquinoxalin-4-oxide (4.5 g) is dissolved in methanol (90 ml), and thereto
is added potassium carbonate (1.8 g), and the mixture is stirred at room
30 temperature overnight. The mixture is evaporated to remove the solvent, and to
the residue is added water. The mixture is extracted with chloroform, washed
with water, and dried over anhydrous sodium sulfate. The mixture is
evaporated to remove the solvent, and the crude crystals are recrystallized from

- 299 -

ethyl acetate/n-hexane to give 2-[[5-(1-hydroxyethyl)benzofuran-2-yl]methylaminocarbonyl]-3-methylquinoxalin-4-oxide (3.4 g) as colorless granules.

M.p. 112-114°C

Example 14

5 2-[[5-(1-Hydroxyethyl)benzofuran-2-yl]methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.8 g) is dissolved in chloroform (30 ml), and thereto is added manganese dioxide (3.6 g), and the mixture is refluxed for 6 hours. The reaction solution is filtered through celite, and concentrated. The residue is recrystallized from ethyl acetate/n-hexane to give 2-[[5-acetylbenzofuran-2-yl]methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.5 g) as pale yellow granules.

M.p. 205-206°C

Example 15

15 2-[[5-(5-Acetylbenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.7 g) is dissolved in anhydrous tetrahydrofuran (20 ml), and thereto is added dropwise a 1M solution of methylmagnesium bromide in diethyl ether (2.5 ml) under ice-cooling. The mixture is stirred at room temperature for three hours, and poured into ice-aqueous ammonium chloride solution. The mixture is extracted with chloroform, and the extract is washed with water and brine, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; n-hexane : ethyl acetate = 1 : 1), and recrystallized from n-hexane/ethyl acetate to give 2-[[5-(1-hydroxy-1-methylethyl)benzofuran-2-yl]methylaminocarbonyl]-3-methylquinoxalin-4-oxide (0.1 g) as pale yellow prisms.

M.p. 147-150°C

Example 16

30 2-[[5-(5-Tetrazolyl)benzofuran-2-yl]methylaminocarbonyl]-3-methylquinoxalin-4-oxide (1.4 g) is dissolved in dimethylformamide (15 ml), and thereto are added potassium carbonate (0.97 g) and methyl iodide (0.44 g), and the mixture is stirred at room temperature for four hours. The reaction solution is poured into ice-water, and the precipitated crystals are collected by filtration, and recrystallized from dimethylformamide/ethanol to give 2-[[5-(2-

- 300 -

methyl-5-tetrazolyl)benzofuran-2-yl]methylaminocarbonyl]-3-methylquinoxalin -
4-oxide (0.48 g) as white powder.

M.p. 206-209°C

5 Using the suitable starting compounds, there are obtained the
compounds of Examples 36 and 161-164 in the same manner as in Example
16.

Example 17

2-[(4-Methoxycarbonylmethoxybenzyl)aminocarbonyl]-3 -
methylquinoxaline (3.65 g) is dissolved in methanol (50 ml), and thereto is
10 added 2N sodium hydroxide (6 ml), and the mixture is stirred at room
temperature for two hours. The mixture is evaporated to remove the solvent,
and to the resultant is added water. The mixture is acidified with hydrochloric
acid, and the precipitated crystals are collected by filtration, washed with water,
and dried to give 2-[(4-carboxymethoxybenzyl)aminocarbonyl]-3-methyl -
15 quinoxaline (3.40 g) as white powder.

¹H-NMR (DMSO-d₆) δ ppm: 2.83 (3H, s), 4.48 (2H, d, J=6 Hz), 4.66 (2H,
s), 6.91 (2H, d, J=9 Hz), 7.33 (2H, d, J=9 Hz), 7.8-8.0 (2H, m), 8.0-8.2 (2H, m),
9.33 (1H, t, J=6 Hz)

20 Using the suitable starting compounds, there is obtained the
compound of Example 49 in the same manner as in Example 17.

Example 18

2-[(4-Carboxymethoxybenzyl)aminocarbonyl]-3 -
methylquinoxaline (1.05 g) is dissolved in dimethylformamide (10 ml), and
thereto is added furfurylamine (0.35 g), and thereto are added dropwise
25 successively diethyl cyanophosphate (0.6 g) and triethylamine (0.6 g) under ice -
cooling. The mixture is stirred at room temperature overnight, and poured into
ice-water, and the precipitated crystals are collected by filtration. The crystals
are recrystallized from acetone/n-hexane to give 2-[(4-furfurylaminocarbonyl -
methoxybenzylaminocarbonyl]-3-methylquinoxaline (0.92 g) as white powder.

30 M.p. 175-176°C

Example 19

2-[(4-Methoxycarbonylmethoxybenzyl)aminocarbonyl]-3-

- 301 -

methyloquinoxaline (0.73 g) and 2-methoxyethylamine (1.1 ml) are dissolved in toluene (10 ml), and the mixture is refluxed for three hours. The mixture is evaporated to remove the solvent, and the residue is recrystallized from ethyl acetate to give 2-[[4-(2-methoxyethylaminocarbonylmethoxy)benzyl]amino - carbonyl]-3-methyloquinoxaline (0.95 g) as white powder.

M.p. 138-140°C

Using the suitable starting compounds, there are obtained the compounds of Examples 46, 47, 66, 82, 83, 109, 110, 127, 138, 146-153, 157 - 159, 161-170, 173-175, 186, 187, 191-193, 195 and 196 in the same manner as in Example 18 or 19.

Example 20

2-[(4-Hydroxybenzyl)aminocarbonyl]-3-methyloquinoxaline (1.8 g) is dissolved in acetic acid (30 ml) and chloroform (150 ml), and thereto is added dropwise a solution of bromine (0.32 ml) in acetic acid (5 ml) at room temperature, and the mixture is stirred at the same temperature for three hours. The reaction solution is washed with saturated sodium hydrogen carbonate solution, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent to give 2-[(3-bromo-4-hydroxybenzyl)aminocarbonyl]-3 - methyloquinoxaline (1.0 g) as yellow powder.

The above product is reacted with N-chloroacetylmorpholine in the same manner as in Example 10, and recrystallized from ethyl acetate/n - hexane to give 2-[(3-bromo-4-morpholinocarbonylmethoxybenzyl)amino - carbonyl]-3-methyloquinoxaline (0.6 g) as colorless needles.

M.p. 142-143°C

Using the suitable starting compounds, there are obtained the compounds of Examples 45, 51, 56, 58-60, 64-66, 78, 79, 82-83, 87, 106, 108, 110, 116, 117, 120, 121, 123, 126, 127, 138, 140-142, 144, 146-153, 156-164, 167-177, 182, 185-193, 195, 196, 202, 207, 210-212, 222-224, 230-234 and 241 in the same manner as in Example 10 or 20.

Example 21

2-[(4-Methoxycarbonylbenzyl)aminocarbonyl]-3-methyl - quinoxaline (0.75 g) is dissolved in tetrahydrofuran (40 ml), and thereto is added dropwise with stirring lithium aluminum hydride (0.17 g) under ice-

- 302 -

cooling. The mixture is stirred at the same temperature for three hours, and thereto are added successively aqueous 10 % sodium hydroxide solution (0.3 ml) and water (0.3 ml), and decomposed. The mixture is filtered through celite, and the filtrate is dried over anhydrous sodium sulfate, and evaporated to remove the solvent to give 2-[(4-hydroxymethylbenzyl)aminocarbonyl]-3-methylquinoxaline (0.44 g) as yellow powder.

¹H-NMR (CDCl₃) δ ppm: 1.75 (1H, t, J=6 Hz), 4.70 (4H, d, J=6 Hz), 7.3 - 7.5 (4H, m), 7.7-7.9 (2H, m), 8.0-8.1 (2H, m), 8.39 (1H, brs)

Example 22

Lithium aluminum hydride (1.9 g) is suspended in tetrahydrofuran (100 ml), and thereto is added dropwise and gradually a solution of 2-[(4-methoxycarbonylmethoxybenzyl)aminocarbonyl]-3-methylquinoxaline (9.5 g) in tetrahydrofuran (50 ml) under ice-cooling. After addition, the mixture is stirred at the same temperature for 30 minutes, and further stirred at room temperature for two hours. After the reaction is complete, to the reaction mixture is added ethyl acetate under ice-cooling, and further added saturated aqueous ammonium chloride solution. The insoluble materials are removed by filtration, and extracted with ethyl acetate. The extract is dried over anhydrous sodium sulfate and evaporated to remove the solvent. The residue is purified by silica gel column chromatography (solvent; ethyl acetate : n-hexane = 1 : 4) to give 2-[[4-(2-hydroxyethoxy)benzyl]aminocarbonyl]-3-methylquinoxaline (1.0 g) as yellow liquid.

¹H-NMR (CDCl₃) δ ppm: 2.25 (1H, br), 3.17 (3H, s), 3.9-4.1 (4H, m), 4.63 (2H, d, J=6 Hz), 6.92 (2H, d, J=7 Hz), 7.34 (2H, d, J=7 Hz), 7.7-7.9 (2H, m), 8.0 - 8.1 (2H, m), 8.34 (1H, br)

Example 23

2-[[4-(2-Hydroxyethoxy)benzyl]aminocarbonyl]-3-methylquinoxaline (0.2 g) and triphenylphosphine (0.17 g) is dissolved in carbon tetrachloride (10 ml), and the mixture is refluxed for 1.5 hour. After the reaction is complete, the mixture is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; ethyl acetate : n-hexane = 1 : 2) to give 2-[[4-(2-chloroethoxy)benzyl]aminocarbonyl]-3-methyl-

- 303 -

quinoxaline (0.10 g) as yellow liquid.

¹H-NMR (CDCl₃) δ ppm: 3.17 (3H, s), 3.82 (2H, t, J=6 Hz), 4.24 (2H, t, J=6 Hz), 4.64 (2H, d, J=6 Hz), 6.93 (2H, d, J=9 Hz), 7.35 (2H, d, J=9 Hz), 7.7-7.9 (2H, m), 8.0-8.1 (2H, m), 8.33 (1H, br)

5

Example 24

2-[[4-Chloroethoxy]benzyl]aminocarbonyl-3-methylquinoxaline (100 mg) and morpholine (0.21 ml) are dissolved in dimethylformamide (10 ml), and thereto are added sodium iodide (1.2 g) and potassium carbonate (300 mg), and the mixture is heated at 60°C for 7.5 hours. After the reaction is complete, the mixture is poured into ice-water, and extracted with ethyl acetate. The organic layer is washed with water and brine, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; ethyl acetate : n-hexane = 2 : 3) to give yellow liquid, which is dissolved in ethanol, and thereto is added ethanol-hydrochloric acid solution, and concentrated to dryness. The precipitated crystals are recrystallized from ethanol/diethyl ether to give 2-[[4-(2-morpholinoethoxy)benzyl]aminocarbonyl]-3-methylquinoxaline hydrochloride (70 mg) as yellow powder.

10

15

M.p. 155-158°C (decomposed)

20

Using the suitable starting compounds, there is obtained the compound of Example 203 in the same manner as in Example 24.

Example 25

2-[[4-(2-Methyl-1,3-dioxolan-2-yl)benzyl]aminocarbonyl]-3-methylquinoxalin-4-oxide (1.3 g) is dissolved in acetone (20 ml) and dichloro-methane (10 ml), and thereto is added p-toluenesulfonic acid (60 mg), and the mixture is stirred at room temperature for five hours. The mixture is evaporated to remove the solvent, and the residue is extracted with ethyl acetate. The extract is washed with saturated aqueous sodium hydrogen carbonate solution, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is recrystallized from ethanol to give 2-[(4-acetylbenzyl)aminocarbonyl]-3-methylquinoxalin-4-oxide (1.0 g) as pale yellow needles.

25

30

- 304 -

M.p. 165-167°C

Example 26

2-[2-(4-Methoxyphenylthio)ethylaminocarbonyl]-3 -

5 methylquinoxalin-4-oxide (2.4 g) is dissolved in methylene chloride (40 ml), and thereto are gradually added m-chloroperbenzoic acid (1.4 g) under ice - cooling, and the mixture is stirred at the same temperature for one hour. The reaction solution is washed with aqueous sodium thiosulfate solution, saturated sodium hydrogen carbonate solution and water, and dried over anhydrous sodium sulfate. The mixture is evaporated to remove the solvent, and the
10 residue is purified by silica gel column chromatography (solvent; ethyl acetate), and recrystallized from ethanol to give 2-[2-(4-methoxyphenylsulfinyl)ethyl - aminocarbonyl]-3-methylquinoxalin-4-oxide (1.8 g) as colorless needles.

M.p. 156-157°C

Using the suitable starting compounds, there are obtained the
15 compounds of Examples 212 and 217-220 in the same manner as in Example 26.

Example 27

2-[2-(4-Methoxyphenylthio)ethylaminocarbonyl]-3-methyl -

quinoxalin-4-oxide (2.4 g) is dissolved in methylene chloride (40 ml), and
20 thereto is added gradually m-chloroperbenzoic acid (2.8 g) under ice-cooling. The mixture is reacted at the same temperature for one hour, and the reaction solution is washed with aqueous sodium thiosulfate solution, saturated sodium hydrogen carbonate solution and water, and dried over anhydrous sodium sulfate. The mixture is evaporated to remove the solvent, and the residue is
25 recrystallized from ethanol to give 2-[2-(4-methoxyphenylsulfonyl)ethyl - aminocarbonyl]-3-methylquinoxalin-4-oxide (2.1 g) as colorless needles.

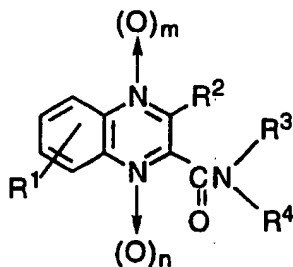
M.p. 148-150°C

Using the suitable starting compounds, there are obtained the
compounds of Examples 218 and 220 in the same manner as in Example 27.

30 Using the suitable starting compounds, there are obtained the compounds as listed in Table 5 in the same manner as in Example 1, 2 or 3.

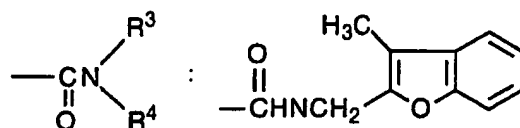
- 305 -

Table 5



Example 28

Structure:



R1: H

R2: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

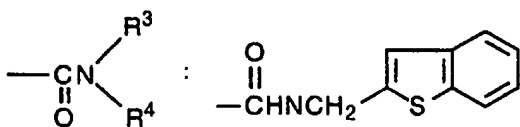
Solvent for recrystal.: Ethanol

M.p. (°C): 154-157

Form: Free

Example 29

Structure:



R1: H

R2: CH₃

m: 1

n: 0

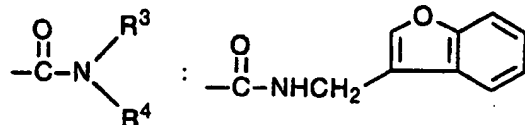
Crystalline form: Colorless needles

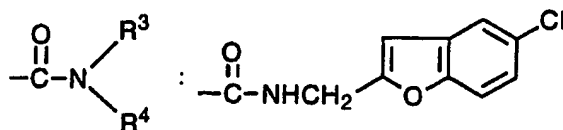
Solvent for recrystal.: Ethanol

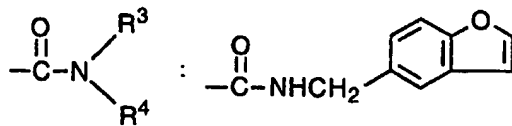
M.p. (°C): 169-170

Form: Free

- 306 -

Example 30**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Colorless needles****Solvent for recrystal.: Ethanol****M.p. (°C): 143-144****Form: Free**

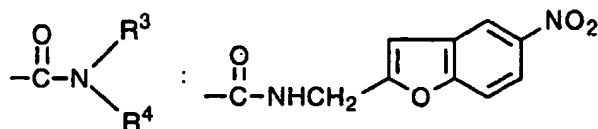
Example 31**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Pale yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 121-128****Form: Free**

Example 32**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Orange granules****Solvent for recrystal.: Ethanol****M.p. (°C): 173-174****Form: Free**

- 307 -

Example 33

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow granules

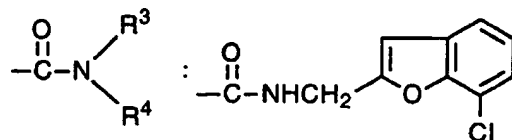
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 192-195

Form: Free

Example 34

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow powder

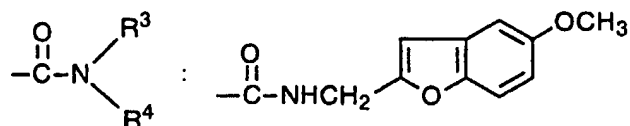
Solvent for recrystal.: Ethanol/water

M.p. (°C): 180-182

Form: Free

Example 35

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless granules

Solvent for recrystal.: n-Hexane/ethyl acetate

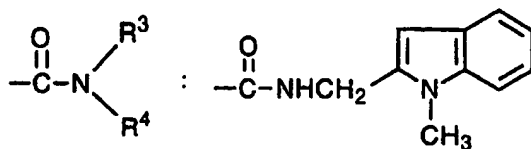
M.p. (°C): 149-151

Form: Free

- 308 -

Example 36

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

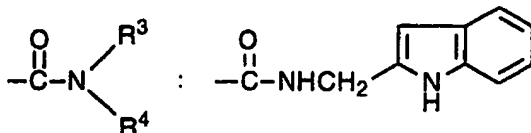
Solvent for recrystal.: Ethanol

M.p. (°C): 171-177

Form: Free

Example 37

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow prisms

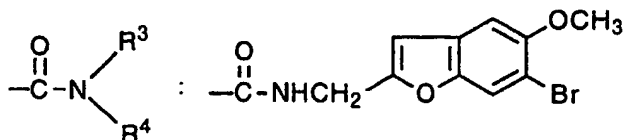
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 210-212 (decomposed)

Form: Free

Example 38

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless flakes

Solvent for recrystal.: Acetonitrile

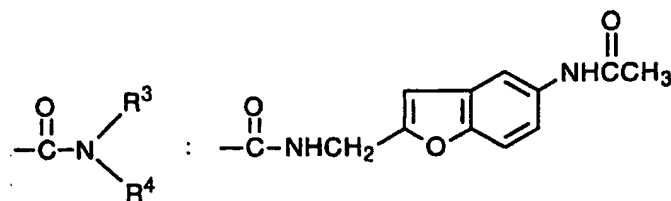
M.p. (°C): 215-217 (decomposed)

Form: Free

- 309 -

Example 39

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

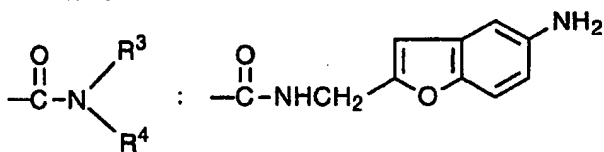
Crystalline form: Pale yellow needles

Solvent for recrystal.: Acetonitrile

M.p. ($^{\circ}\text{C}$): 183-184Form: Free

Example 40

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

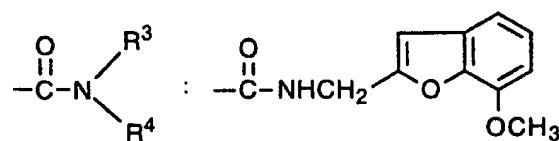
Crystalline form: Yellow powder

Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. ($^{\circ}\text{C}$): 182-183Form: Free

Example 41

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

Crystalline form: Pale red needles

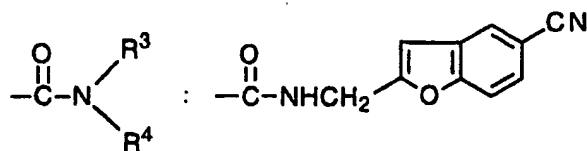
Solvent for recrystal.: Ethanol

M.p. ($^{\circ}\text{C}$): 173-174Form: Free

- 310 -

Example 42

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

Crystalline form: Yellow granules

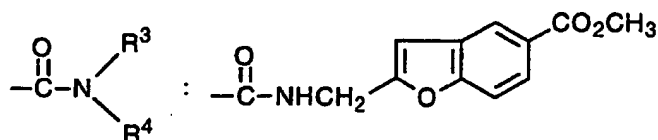
Solvent for recrystal.: Acetonitrile

M.p. ($^{\circ}\text{C}$): 214-215 (decomposed)

Form: Free

Example 43

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

Crystalline form: Pale yellow needles

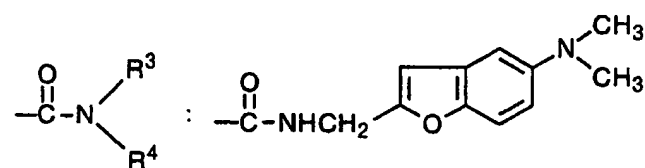
Solvent for recrystal.: Ethanol

M.p. ($^{\circ}\text{C}$): 187-189

Form: Free

Example 44

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

Crystalline form: Yellow plates

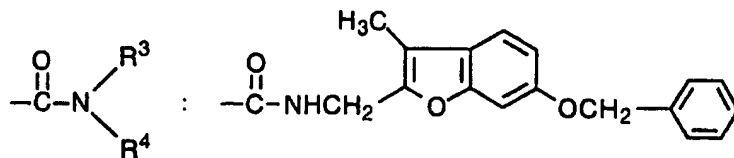
Solvent for recrystal.: Acetonitrile

M.p. ($^{\circ}\text{C}$): 155-157Form: Free

- 311 -

Example 45

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

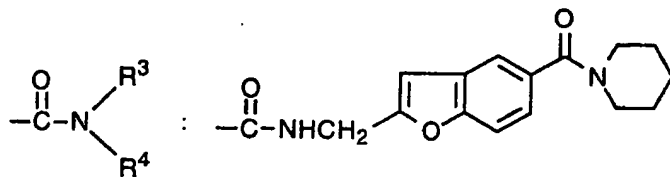
Solvent for recrystal.: Acetonitrile

M.p. (°C): 159-160

Form: Free

Example 46

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: White powder

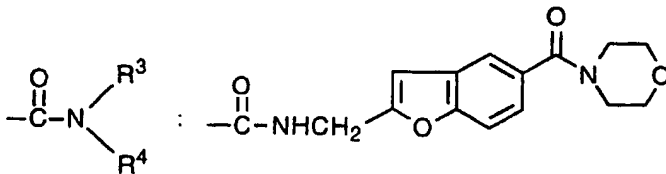
Solvent for recrystal.: 2-Propanol

M.p. (°C): 183-184

Form: Free

Example 47

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: 2-Propanol

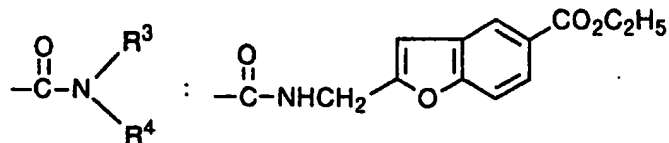
M.p. (°C): 146-148

Form: Free

- 312 -

Example 48

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow prisms

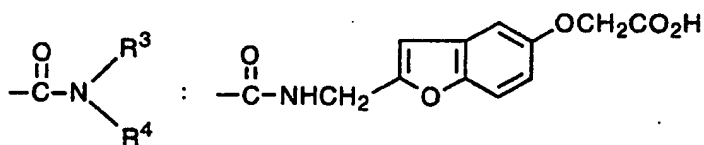
Solvent for recrystal.: Acetonitrile

M.p. (°C): 168-169

Form: Free

Example 49

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

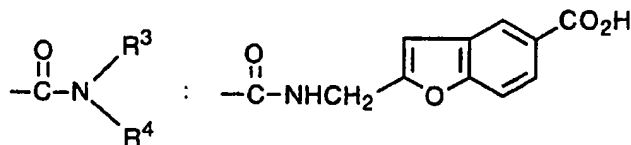
Solvent for recrystal.: Ethanol/water

M.p. (°C): 202-204

Form: Free

Example 50

Structure:

R¹: HR²: CH₃

m: 1

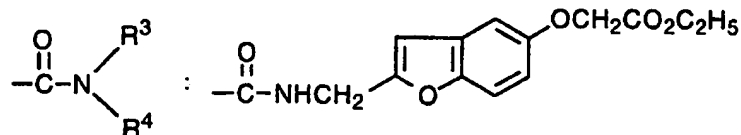
n: 0

Crystalline form: White powder

M.p. (°C): 251-252 (decomposed)

Form: Free

- 313 -

Example 51**Structure:**R¹: HR²: CH₃

m: 1

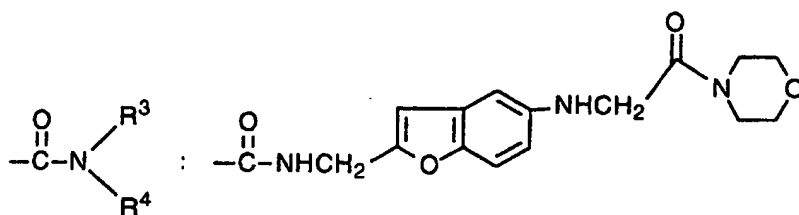
n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 120-122

Form: Free

Example 52**Structure:**R¹: HR²: CH₃

m: 1

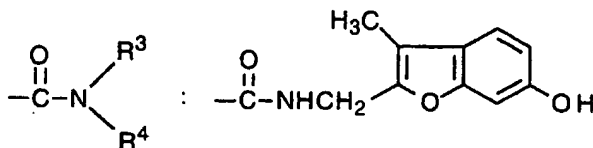
n: 0

Crystalline form: Pale brown granules

Solvent for recrystal.: Ethanol

M.p. (°C): 159-167 (decomposed)

Form: Oxalate

Example 53**Structure:**R¹: HR²: CH₃

m: 1

n: 0

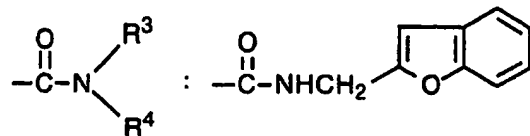
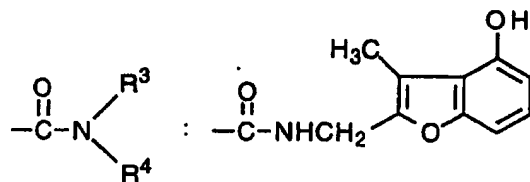
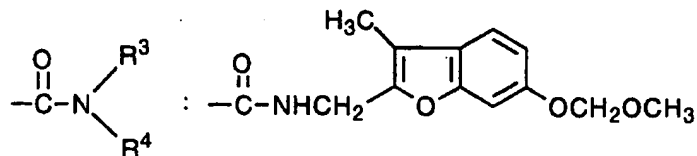
Crystalline form: Yellow needles

Solvent for recrystal.: Dimethylformamide/water

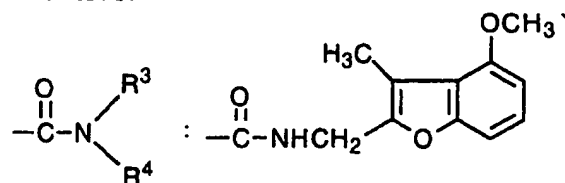
M.p. (°C): 222-223 (decomposed)

Form: Free

- 314 -

Example 54**Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**Crystalline form:** Colorless needles**Solvent for recrystal.:** n-Hexane/ethyl acetate**M.p. (°C):** 156-158**Form:** Free**Example 55****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**Crystalline form:** Yellow granules**Solvent for recrystal.:** Dimethylformamide/water**M.p. (°C):** 237-238 (decomposed)**Form:** Free**Example 56****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**Crystalline form:** White powder**M.p. (°C):** 130-132**Form:** Free

- 315 -

Example 57**Structure:** R^1 : H R^2 : CH_3

m: 1

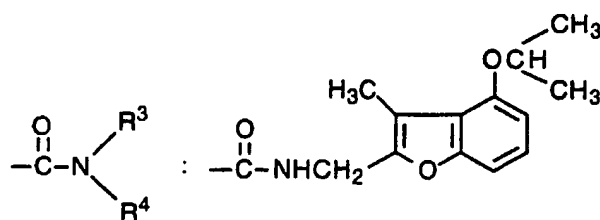
n: 0

Crystalline form: Yellow prisms

Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. ($^{\circ}\text{C}$): 196-197

Form: Free

Example 58**Structure:** R^1 : H R^2 : CH_3

m: 1

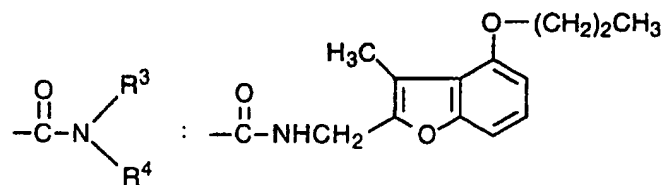
n: 0

Crystalline form: Yellow plates

Solvent for recrystal.: Ethanol

M.p. ($^{\circ}\text{C}$): 123-124

Form: Free

Example 59**Structure:** R^1 : H R^2 : CH_3

m: 1

n: 0

Crystalline form: Pale yellow needles

Solvent for recrystal.: Ethanol

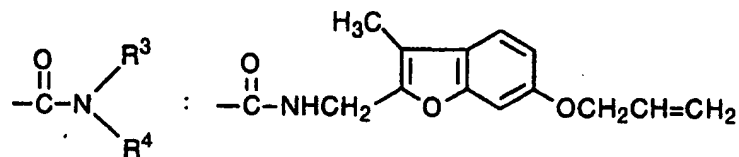
M.p. ($^{\circ}\text{C}$): 177-178

Form: Free

- 316 -

Example 60

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

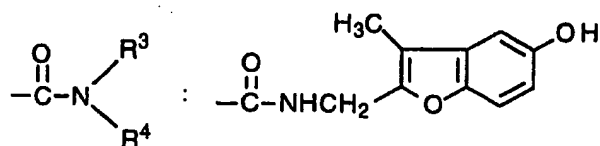
Solvent for recrystal.: Dimethylformamide

M.p. (°C): 155-156

Form: Free

Example 61

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

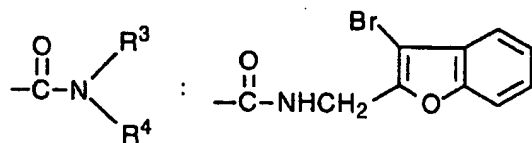
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 220-221

Form: Free

Example 62

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

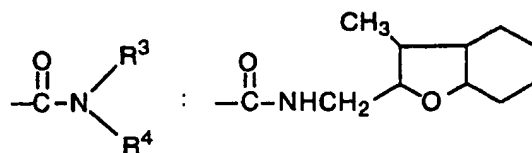
M.p. (°C): 170-171

Form: Free

- 317 -

Example 63

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

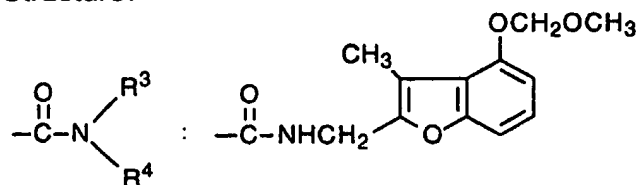
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 125-126

Form: Free

Example 64

Structure:

R¹: HR²: CH₃

m: 1

n: 0

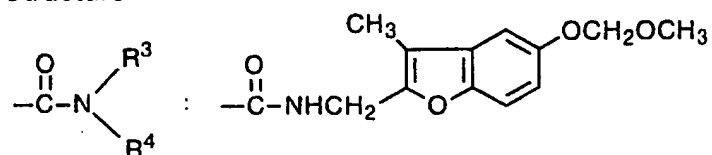
Crystalline form: White powder

M.p. (°C): 166-168

Form: Free

Example 65

Structure:

R¹: HR²: CH₃

m: 1

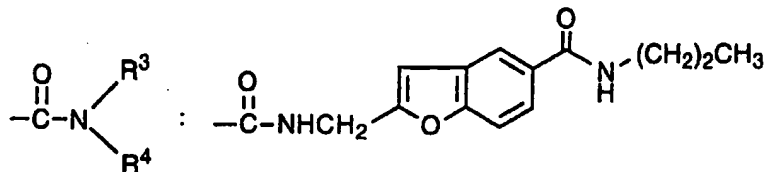
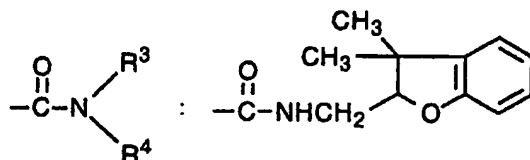
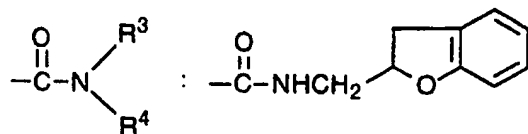
n: 0

Crystalline form: White powder

M.p. (°C): 114-116

Form: Free

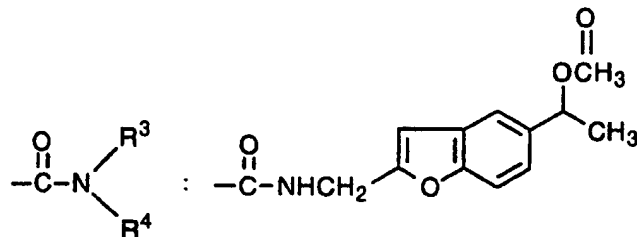
- 318 -

Example 66**Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**Crystalline form:** White powder**Solvent for recrystal.:** Acetonitrile**M.p. (°C):** 184-186**Form:** Free**Example 67****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**Crystalline form:** White granules**Solvent for recrystal.:** Ethyl acetate/n-hexane**M.p. (°C):** 160-161**Form:** Free**Example 68****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**Crystalline form:** Pale yellow powder**Solvent for recrystal.:** Ethyl acetate/n-hexane**M.p. (°C):** 70-72**Form:** Free

- 319 -

Example 69

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless granules

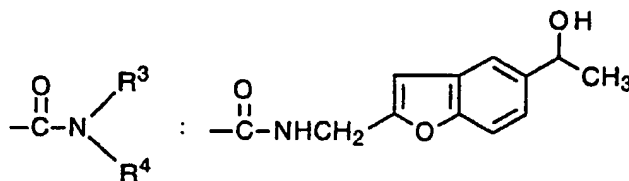
Solvent for recrystal.: Ethanol

M.p. (°C): 89-90

Form: Free

Example 70

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless granules

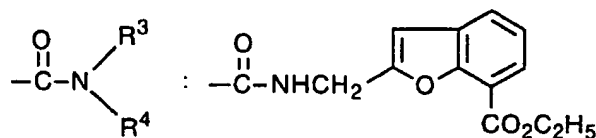
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 112-114

Form: Free

Example 71

Structure:

R¹: HR²: CH₃

m: 1

n: 0

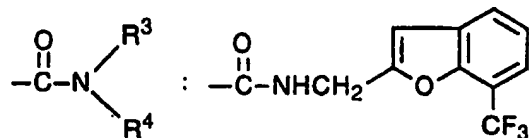
Crystalline form: Pale yellow rods

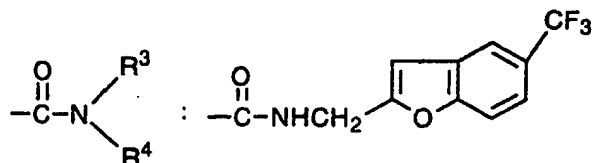
Solvent for recrystal.: Acetonitrile

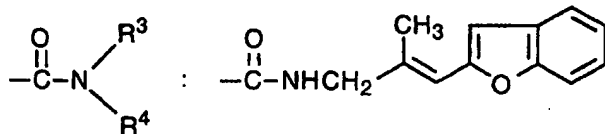
M.p. (°C): 184-185

Form: Free

- 320 -

Example 72**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Colorless needles****Solvent for recrystal.: n-Hexane/ethyl acetate****M.p. (°C): 153-155****Form: Free**

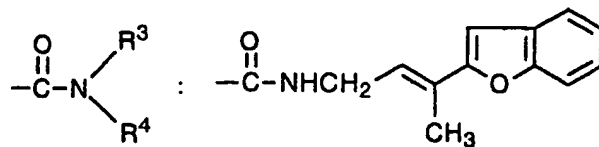
Example 73**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Colorless needles****Solvent for recrystal.: n-Hexane/ethyl acetate****M.p. (°C): 160-162****Form: Free**

Example 74**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Pale yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 143-144****Form: Free**

- 321 -

Example 75

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

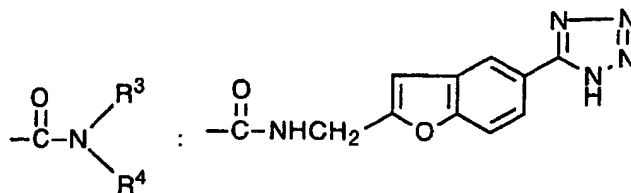
Solvent for recrystal.: Ethanol

M.p. (°C): 199-201

Form: Free

Example 76

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Yellow powder

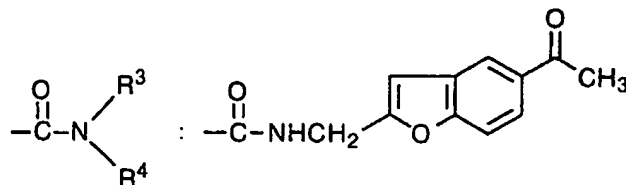
Solvent for recrystal.: Dimethylformamide/ethanol

M.p. (°C): 256-258 (decomposed)

Form: Free

Example 77

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow granules

Solvent for recrystal.: n-Hexane/ethyl acetate

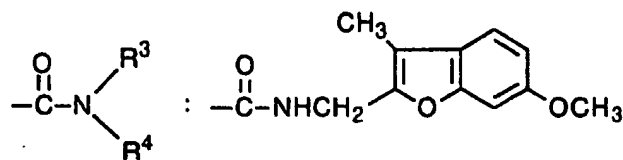
M.p. (°C): 205-206

Form: Free

- 322 -

Example 78

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow powder

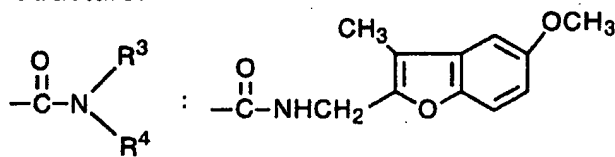
Solvent for recrystal.: Ethanol

M.p. (°C): 154-155

Form: Free

Example 79

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless prisms

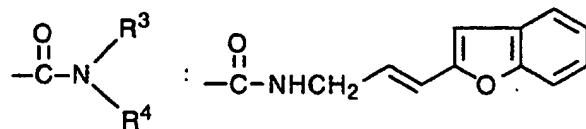
Solvent for recrystal.: Ethanol

M.p. (°C): 169-170

Form: Free

Example 80

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Brown powder

Solvent for recrystal.: Ethanol

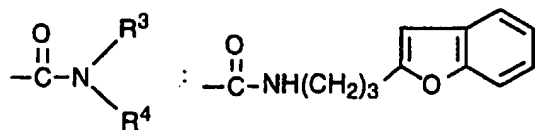
M.p. (°C): 133-135

Form: Free

- 323 -

Example 81

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow plates

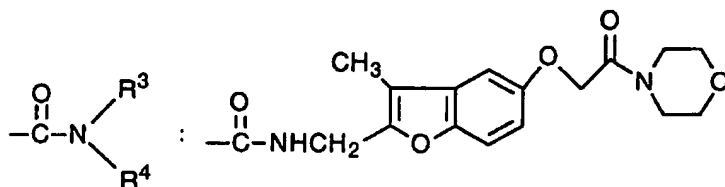
Solvent for recrystal.: Ethanol

M.p. (°C): 112-114

Form: Free

Example 82

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow rods

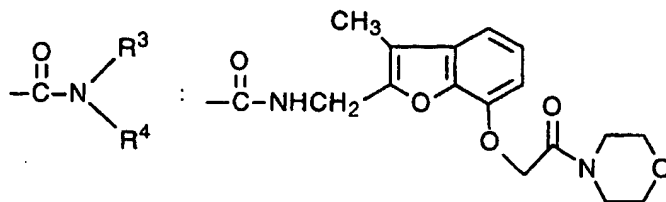
Solvent for recrystal.: Dimethylformamide/ethanol

M.p. (°C): 189-190

Form: Free

Example 83

Structure:

R¹: HR²: CH₃

m: 1

n: 0

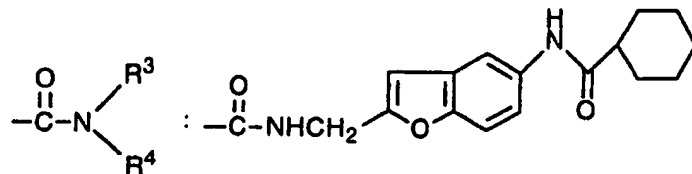
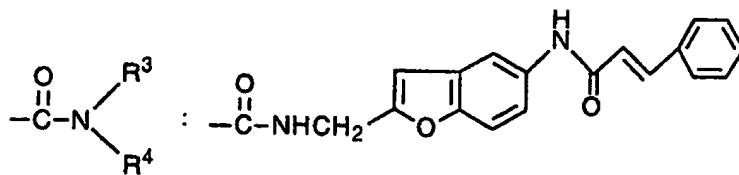
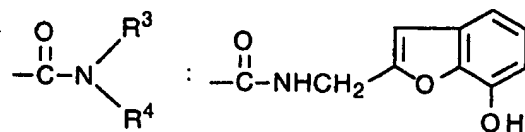
Crystalline form: Pale yellow powder

Solvent for recrystal.: Dimethylformamide/ethanol

M.p. (°C): 177-178

Form: Free

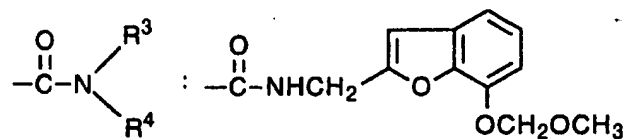
- 324 -

Example 84**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: White powder****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 230-232****Form: Free****Example 85****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: White powder****Solvent for recrystal.: Ethyl acetate****M.p. (°C): 218-220****Form: Free****Example 86****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Pale yellow needles****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 214-215****Form: Free**

- 325 -

Example 87

Structure:

R¹: HR²: CH₃

m: 1

n: 0

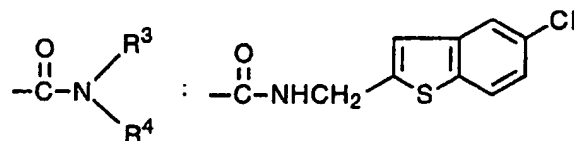
Crystalline form: White powder

M.p. (°C): 146-147

Form: Free

Example 88

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless flakes

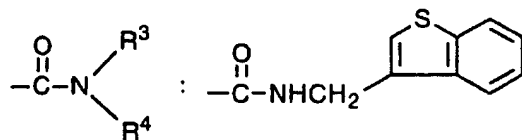
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 180-181

Form: Free

Example 89

Structure:

R¹: HR²: CH₃

m: 1

n: 0

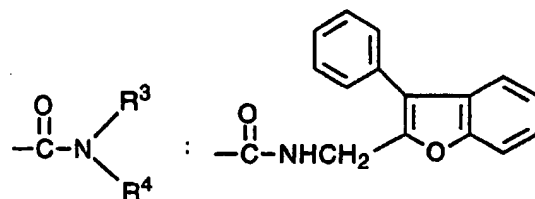
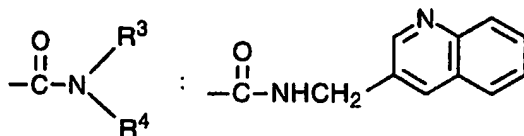
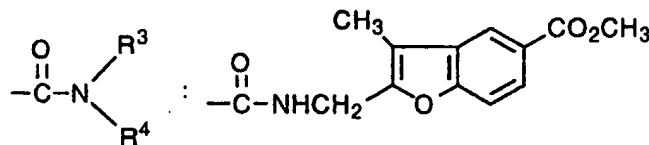
Crystalline form: Colorless needles

Solvent for recrystal.: Chloroform/n-hexane

M.p. (°C): 186-188

Form: Free

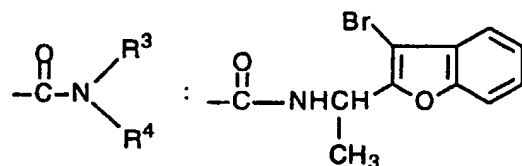
- 326 -

Example 90**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Yellow powder****Solvent for recrystal.: Diethyl ether/n-hexane****M.p. (°C): 80-83****Form: Free****Example 91****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Brown prisms****Solvent for recrystal.: Acetone/n-hexane****M.p. (°C): 179-180****Form: Free****Example 92****Structure****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: White powder****Solvent for recrystal.: Ethanol****M.p. (°C): 206-207****Form: Free**

- 327 -

Example 93

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

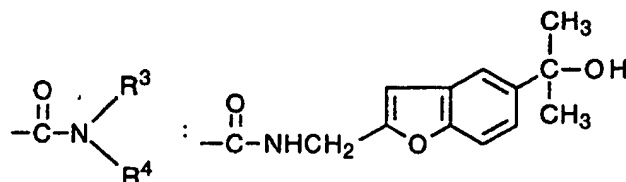
Solvent for recrystal.: Ethanol

M.p. (°C): 139-141

Form: Free

Example 94

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow prisms

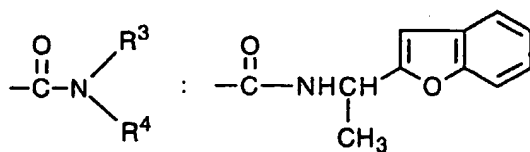
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 147-150

Form: Free

Example 95

Structure:

R¹: HR²: CH₃

m: 1

n: 0

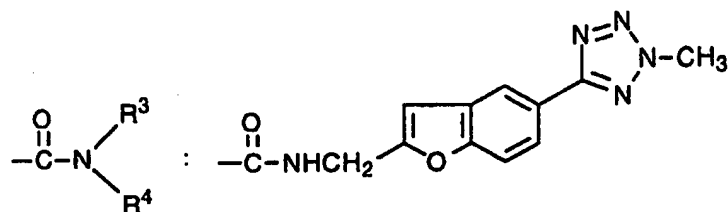
Crystalline form: White powder

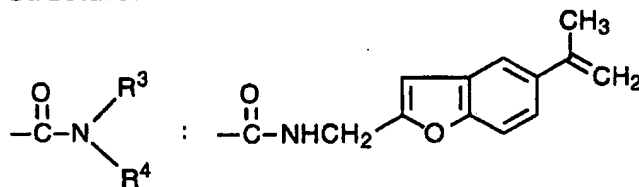
Solvent for recrystal.: Ethanol

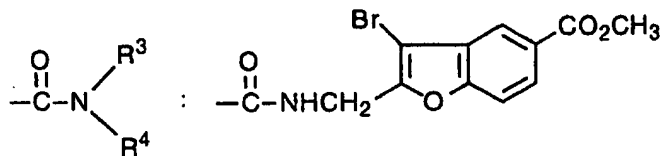
M.p. (°C): 133-134

Form: Free

- 328 -

Example 96**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: White powder****Solvent for recrystal.: Dimethylformamide/ethanol****M.p. (°C): 206-209****Form: Free**

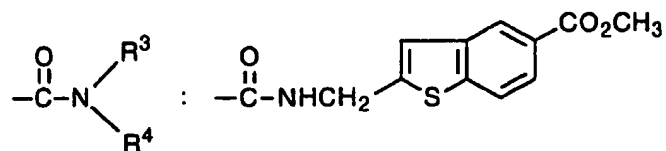
Example 97**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Pale yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 117-119****Form: Free**

Example 98**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Pale yellow powder****Solvent for recrystal.: Ethanol****M.p. (°C): 200-202 (decomposed)****Form: Free**

- 329 -

Example 99

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale brown needles

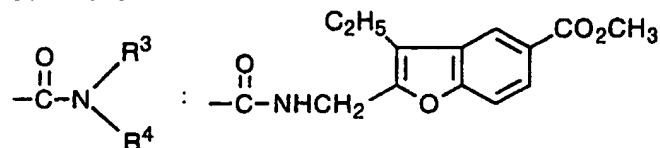
Solvent for recrystal.: Acetone/n-hexane

M.p. (°C): 199-200

Form: Free

Example 100

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

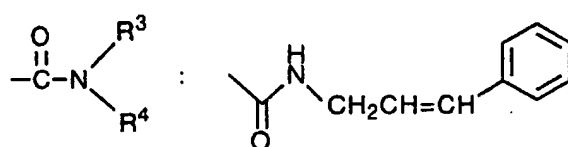
Solvent for recrystal.: Ethanol

M.p. (°C): 167-168

Form: Free

Example 101

Structure:

R¹: HR²: CH₃

m: 0

n: 1

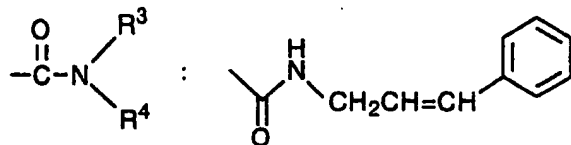
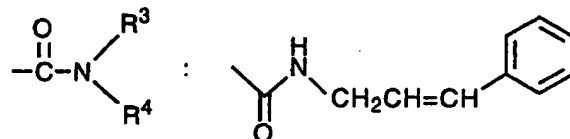
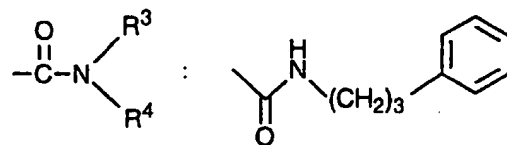
Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 152-153

Form: Free

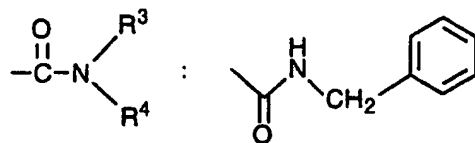
- 330 -

Example 102**Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 1**Crystalline form:** Yellow powder**Solvent for recrystal.:** Ethanol**M.p. (°C):** 130-133 (decomposed)**Form:** Free**Example 103****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**Crystalline form:** Colorless needles**Solvent for recrystal.:** Ethanol**M.p. (°C):** 143-144**Form:** Free**Example 104****Structure:****R¹:** H**R²:** CH₃**m:** 0**n:** 0**Crystalline form:** Pale brown needles**Solvent for recrystal.:** Diisopropyl ether/n-hexane**Form:** Free

- 331 -

Example 105

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Pale brown prisms

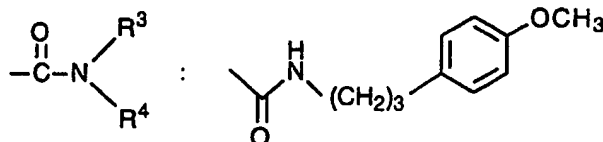
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 122-124

Form: Free

Example 106

Structure:

R¹: HR²: CH₃

m: 0

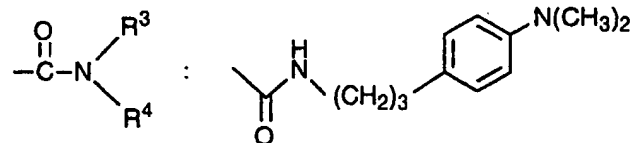
n: 0

Crystalline form: Pale yellow needles

Form: Free

Example 107

Structure:

R¹: HR²: CH₃

m: 0

n: 0

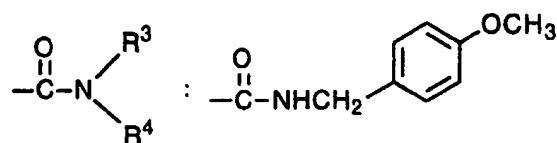
Crystalline form: Pale yellow needles

Form: Free

- 332 -

Example 108

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

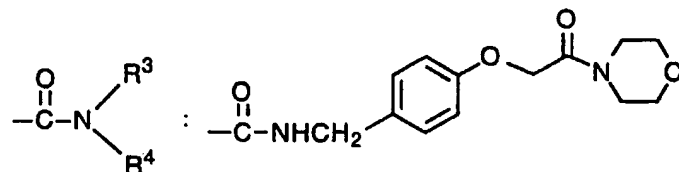
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 99-100

Form: Free

Example 109

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: White powder

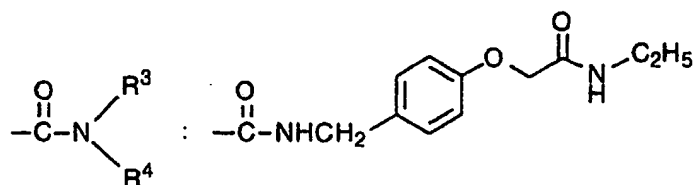
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 124-125

Form: Free

Example 110

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless flakes

Solvent for recrystal.: Ethanol/water

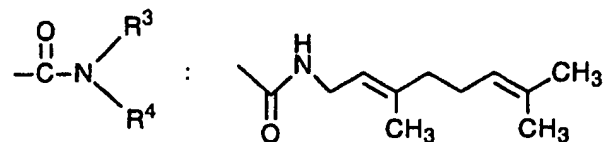
M.p. (°C): 139-140

Form: Free

- 333 -

Example 111

Structure:

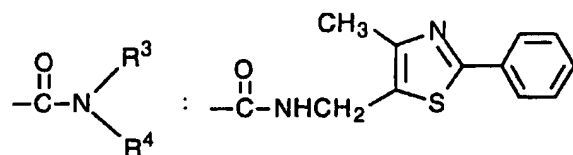
 R^1 : H R^2 : CH_3 m : 0 n : 0

Crystalline form: Pale brown oil

Form: Free

Example 112

Structure:

 R^1 : H R^2 : CH_3 m : 0 n : 0

Crystalline form: Red powder

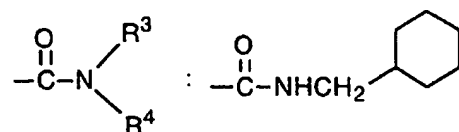
Solvent for recrystal.: Diisopropyl ether/n-hexane

M.p. ($^{\circ}\text{C}$): 148-150

Form: Free

Example 113

Structure:

 R^1 : H R^2 : CH_3 m : 0 n : 0

Crystalline form: Yellow prisms

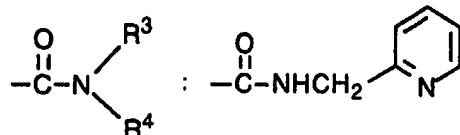
Solvent for recrystal.: n-Hexane

M.p. ($^{\circ}\text{C}$): 105-106Form: Free

- 334 -

Example 114

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

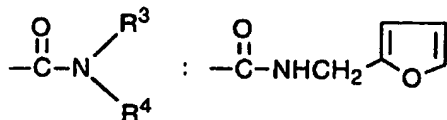
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 135-136

Form: Free

Example 115

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Pale yellow powder

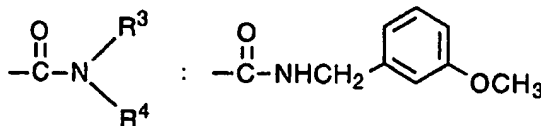
Solvent for recrystal.: Diisopropyl ether/n-hexane

M.p. (°C): 121-122

Form: Free

Example 116

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Diisopropyl ether

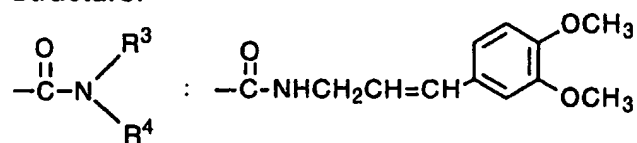
M.p. (°C): 88-89

Form: Free

- 335 -

Example 117

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Pale yellow needles

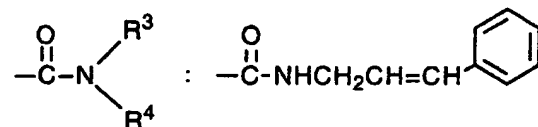
Solvent for recrystal.: Diethyl ether

M.p. (°C): 129-130

Form: Free

Example 118

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

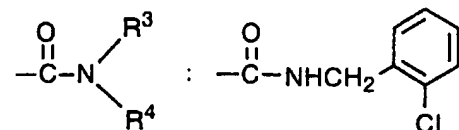
Solvent for recrystal.: n-Hexane/diethyl ether

M.p. (°C): 106-107

Form: Free

Example 119

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Yellow granules

Solvent for recrystal.: Diisopropyl ether/n-hexane

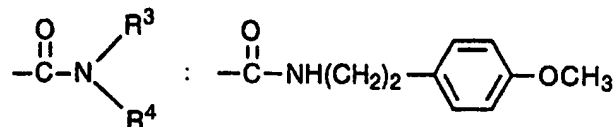
M.p. (°C): 118-119

Form: Free

- 336 -

Example 120

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Pale yellow needles

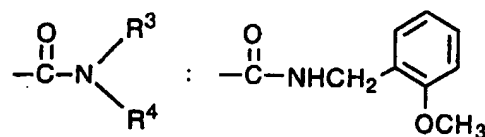
Solvent for recrystal.: Diisopropyl ether/n-hexane

M.p. (°C): 101-102

Form: Free

Example 121

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Yellow granules

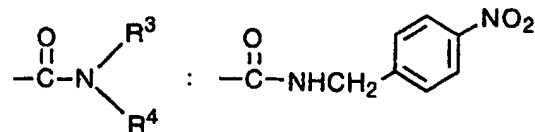
Solvent for recrystal.: Diisopropyl ether/n-hexane

M.p. (°C): 118-119

Form: Free

Example 122

Structure:

R¹: HR²: CH₃

m: 0

n: 0

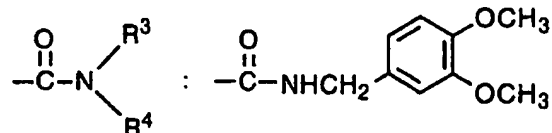
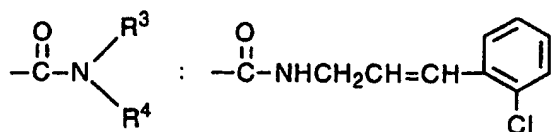
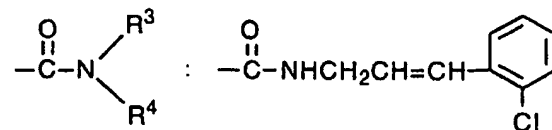
Crystalline form: Orange powder

Solvent for recrystal.: Diisopropyl ether/n-hexane

M.p. (°C): 184-185

Form: Free

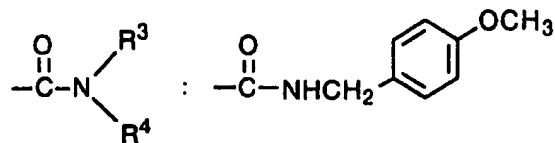
- 337 -

Example 123**Structure:****R¹: H****R²: CH₃****m: 0****n: 0****Crystalline form: Yellow plates****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 148-150****Form: Free****Example 124****Structure:****R¹: H****R²: CH₃****m: 0****n: 0****Crystalline form: Colorless needles****Solvent for recrystal.: Diisopropyl ether****M.p. (°C): 124-125****Form: Free****Example 125****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Colorless flakes****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 122-123****Form: Free**

- 338 -

Example 126

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

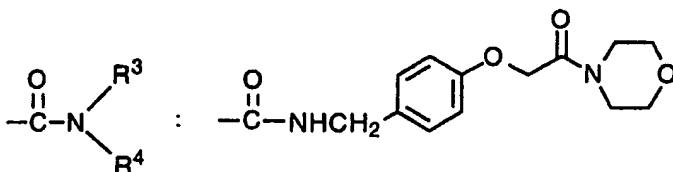
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 115-116

Form: Free

Example 127

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

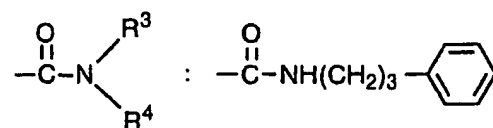
Solvent for recrystal.: Acetonitrile

M.p. (°C): 142-143

Form: Free

Example 128

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

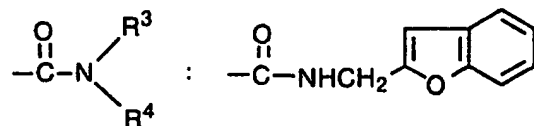
M.p. (°C): 99-100

Form: Free

- 339 -

Example 129

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Pale yellow granules

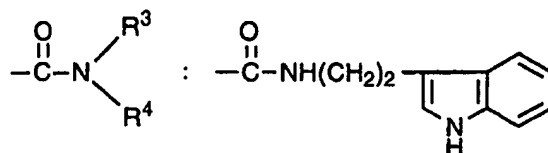
Solvent for recrystal.: Methanol/water

M.p. (°C): 102-103

Form: Free

Example 130

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Yellow needles

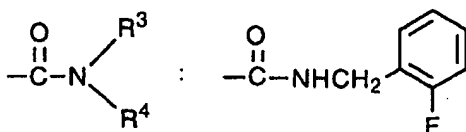
Solvent for recrystal.: Ethanol

M.p. (°C): 211-213

Form: Free

Example 131

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

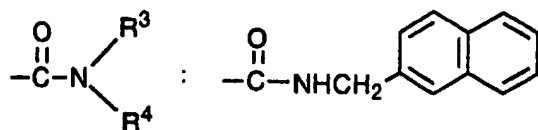
M.p. (°C): 123-124

Form: Free

- 340 -

Example 132

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

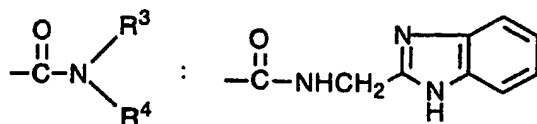
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 146-147

Form: Free

Example 133

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Orange needles

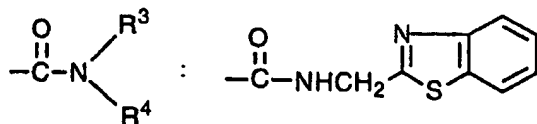
Solvent for recrystal.: Ethanol

M.p. (°C): 246-248 (decomposed)

Form: Free

Example 134

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Orange powder

Solvent for recrystal.: Ethanol

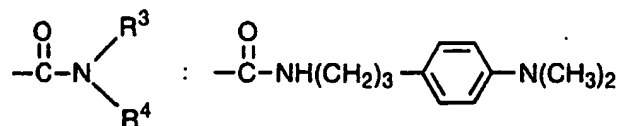
M.p. (°C): 188-190

Form: Free

- 341 -

Example 135

Structure:

R¹: HR²: CH₃

m: 1

n: 0

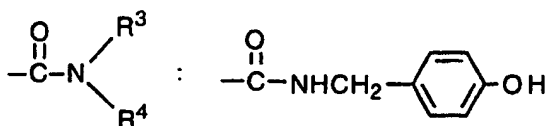
Crystalline form: Orange powder

Solvent for recrystal.: Acetone

Form: Oxalate

Example 136

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

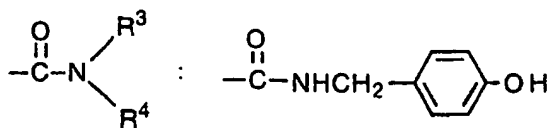
Solvent for recrystal.: Ethanol

M.p. (°C): 211-214

Form: Free

Example 137

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Yellow granules

Solvent for recrystal.: Ethyl acetate

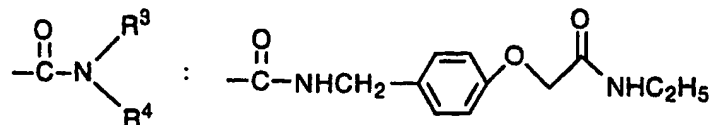
M.p. (°C): 187-192

Form: Free

- 342 -

Example 138

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

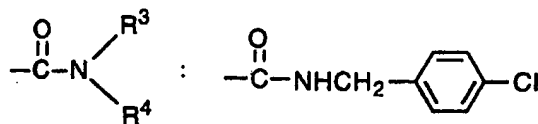
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 190-199

Form: Free

Example 139

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

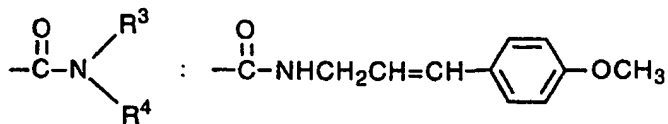
Solvent for recrystal.: Diisopropyl ether

M.p. (°C): 147-148

Form: Free

Example 140

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Pale yellow powder

Solvent for recrystal.: Diisopropyl ether

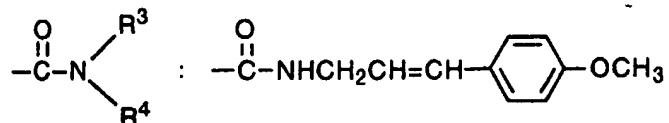
M.p. (°C): 116-117

Form: Free

- 343 -

Example 141

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Orange powder

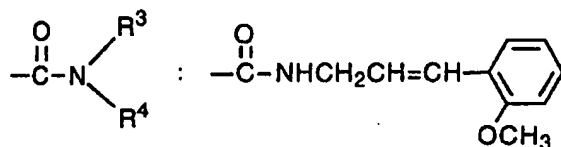
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 120-122

Form: Free

Example 142

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Yellow needles

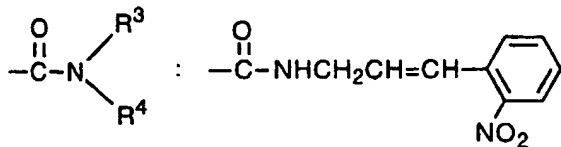
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 127-128

Form: Free

Example 143

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

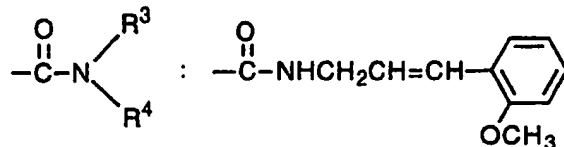
M.p. (°C): 128-130

Form: Free

- 344 -

Example 144

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

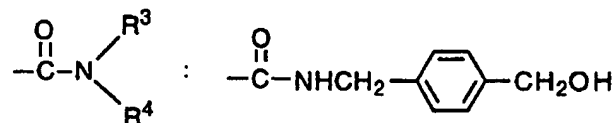
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 123-124

Form: Free

Example 145

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Yellow prisms

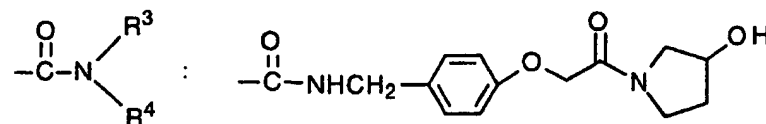
Solvent for recrystal.: Isopropanol/diisopropyl ether

M.p. (°C): 171-173

Form: Free

Example 146

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow granules

Solvent for recrystal.: Isopropanol/diisopropyl ether

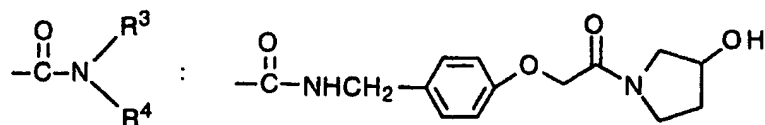
M.p. (°C): 176-177

Form: Free

- 345 -

Example 147

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless flakes

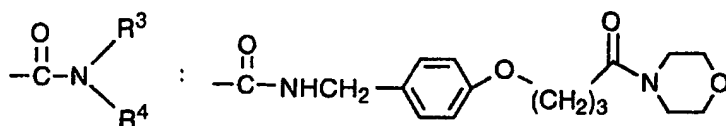
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 148-149

Form: Free

Example 148

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

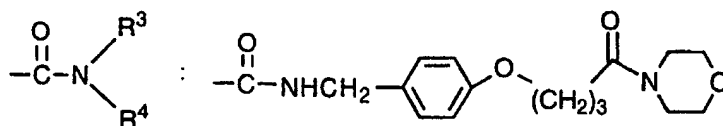
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 119-120

Form: Free

Example 149

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: White powder

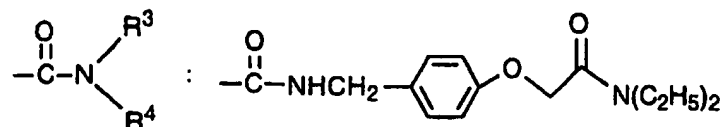
M.p. (°C): 135-137

Form: Free

- 346 -

Example 150

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: White powder

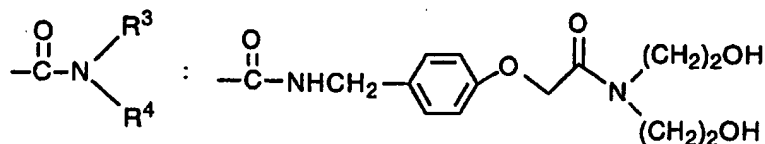
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 118-119

Form: Free

Example 151

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless prisms

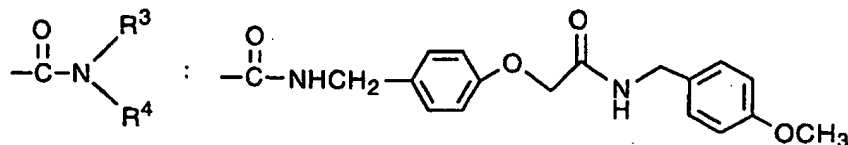
Solvent for recrystal.: Acetone

M.p. (°C): 135-137

Form: Free

Example 152

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Acetone/n-hexane

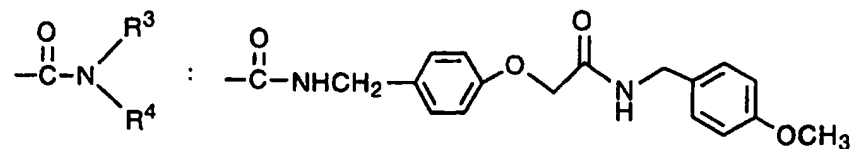
M.p. (°C): 196-198

Form: Free

- 347 -

Example 153

Structure:

 R^1 : H R^2 : CH_3 m : 0 n : 0

Crystalline form: Colorless flakes

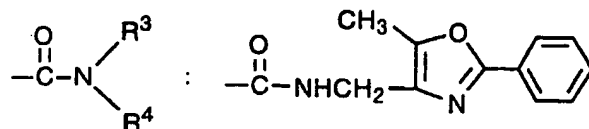
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. ($^{\circ}\text{C}$): 133-134

Form: Free

Example 154

Structure:

 R^1 : H R^2 : CH_3 m : 1 n : 0

Crystalline form: Colorless needles

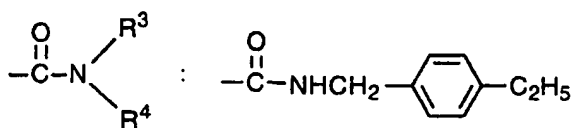
Solvent for recrystal.: Dimethylformamide

M.p. ($^{\circ}\text{C}$): 225-226

Form: Free

Example 155

Structure:

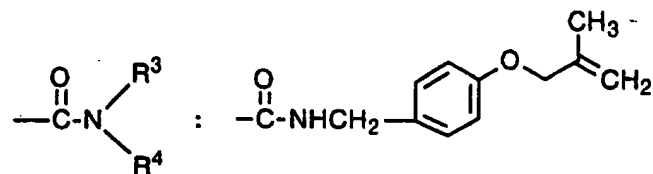
 R^1 : H R^2 : CH_3 m : 1 n : 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. ($^{\circ}\text{C}$): 98-100Form: Free

- 348 -

Example 156**Structure:**R¹: HR²: CH₃

m: 1

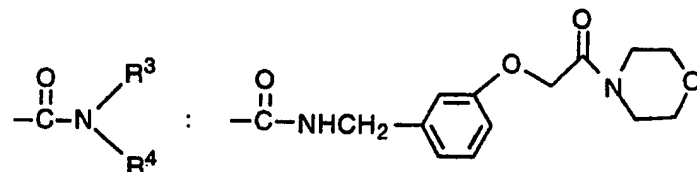
n: 0

Crystalline form: Pale yellow powder

Solvent for recrystal.: Ethyl acetate

M.p. (°C): 100-101

Form: Free

Example 157**Structure:**R¹: HR²: CH₃

m: 1

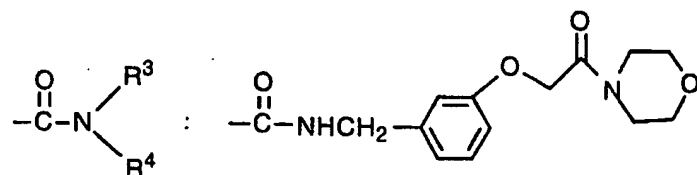
n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 144-145

Form: Free

Example 158**Structure:**R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

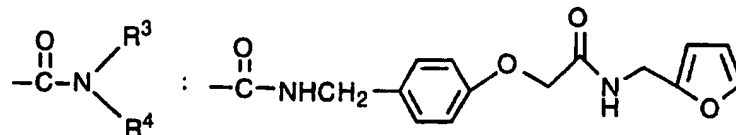
M.p. (°C): 133-134

Form: Free

- 349 -

Example 159

Structure:

R¹: HR²: CH₃

m: 1

n: 0

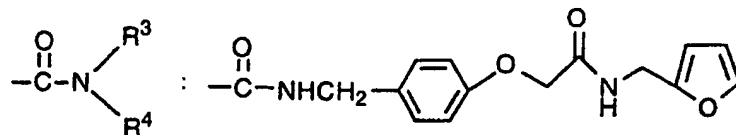
Crystalline form: Pale yellow powder

M.p. (°C): 83-87

Form: Free

Example 160

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: White powder

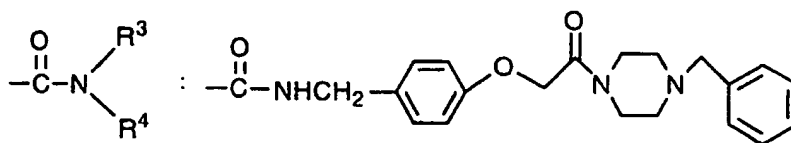
Solvent for recrystal.: Acetone/n-hexane

M.p. (°C): 175-176

Form: Free

Example 161

Structure:

R¹: HR²: CH₃

m: 1

n: 0

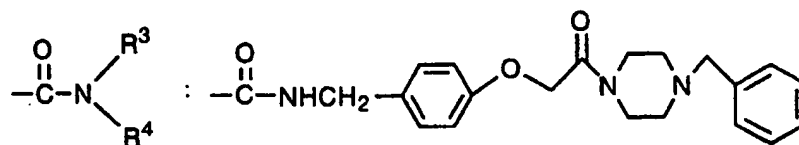
Crystalline form: White powder

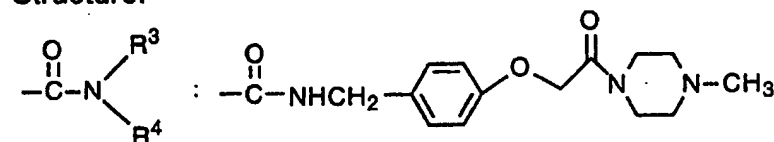
Solvent for recrystal.: Ethanol/diethyl ether

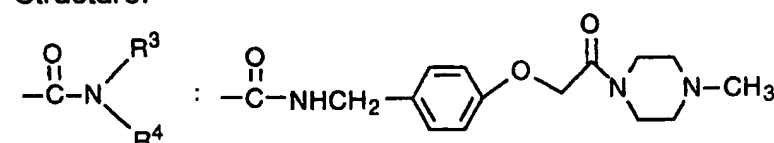
M.p. (°C): 246-247 (decomposed)

Form: Hydrochloride

- 350 -

Example 162**Structure:****R¹: H****R²: CH₃****m: 0****n: 0****Crystalline form: Colorless flakes****Solvent for recrystal.: Methanol/diethyl ether****M.p. (°C): 214-215****Form: Hydrochloride**

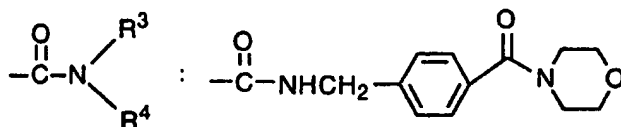
Example 163**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: White powder****M.p. (°C): 212-215 (decomposed)****Form: Hydrochloride**

Example 164**Structure:****R¹: H****R²: CH₃****m: 0****n: 0****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 139-141****Form: Free**

- 351 -

Example 165

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless granules

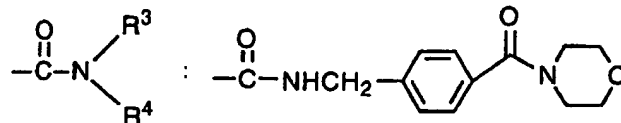
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 170-171

Form: Free

Example 166

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless granules

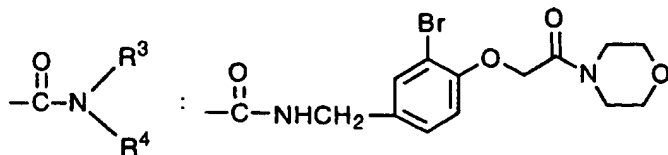
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 152-153

Form: Free

Example 167

Structure:

R¹: HR²: CH₃

m: 1

n: 0

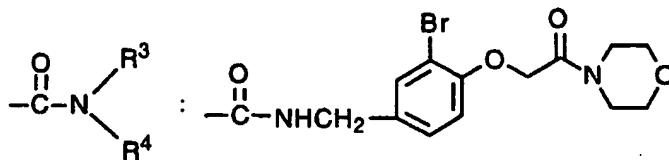
Crystalline form: Colorless needles

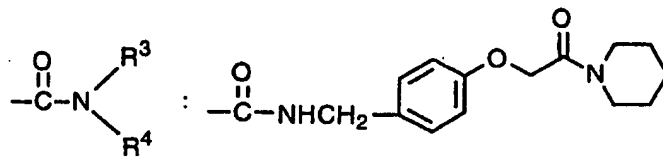
Solvent for recrystal.: Ethyl acetate/n-hexane

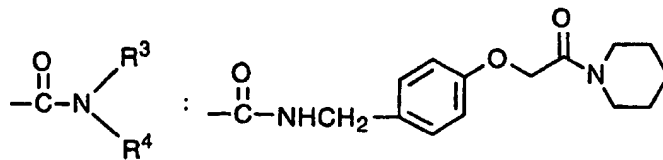
M.p. (°C): 165-166

Form: Free

- 352 -

Example 168**Structure:** $\text{R}^1\text{: H}$ $\text{R}^2\text{: CH}_3$ m: 0 n: 0 **Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 142-143****Form: Free**

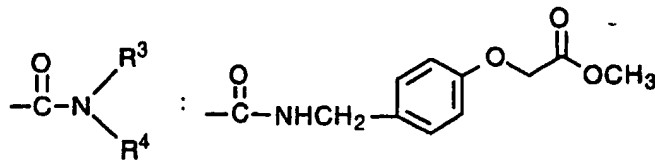
Example 169**Structure:** $\text{R}^1\text{: H}$ $\text{R}^2\text{: CH}_3$ m: 1 n: 0 **Crystalline form: White powder****M.p. (°C): 134-135****Form: Free**

Example 170**Structure:** $\text{R}^1\text{: H}$ $\text{R}^2\text{: CH}_3$ m: 0 n: 0 **Crystalline form: Colorless flakes****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 126-128****Form: Free**

- 353 -

Example 171

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

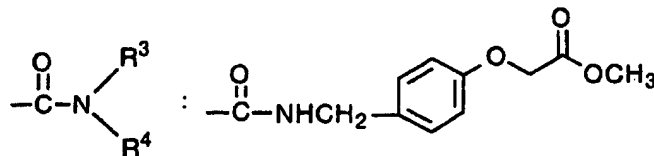
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 126-128

Form: Free

Example 172

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: White powder

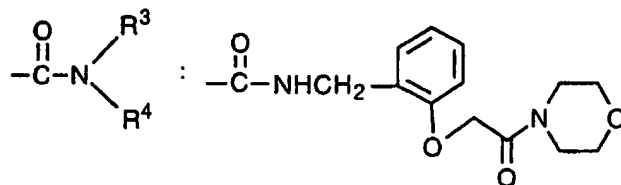
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 106-107

Form: Free

Example 173

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless prisms

Solvent for recrystal.: Acetone/n-hexane

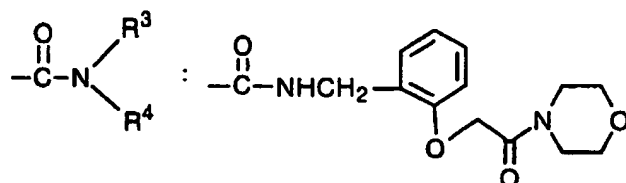
M.p. (°C): 167-169

Form: Free

- 354 -

Example 174

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

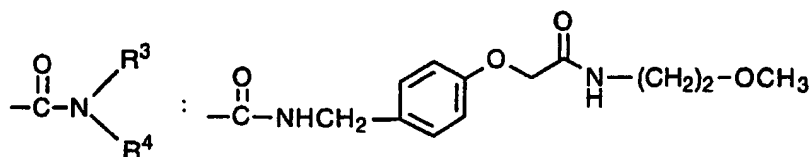
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 129-130

Form: Free

Example 175

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: White powder

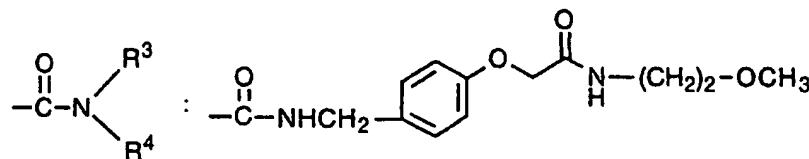
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 135-136

Form: Free

Example 176

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: White powder

Solvent for recrystal.: Ethyl acetate

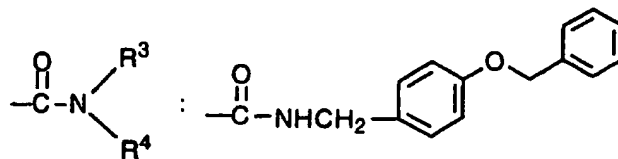
M.p. (°C): 138-140

Form: Free

- 355 -

Example 177

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

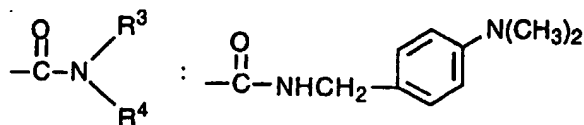
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 140-141

Form: Free

Example 178

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Yellow needles

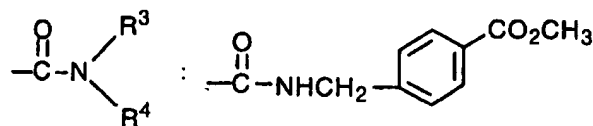
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 146-147

Form: Free

Example 179

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

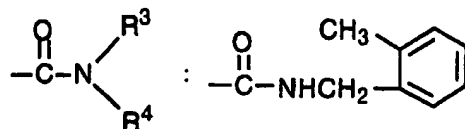
M.p. (°C): 154-155

Form: Free

- 356 -

Example 180

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

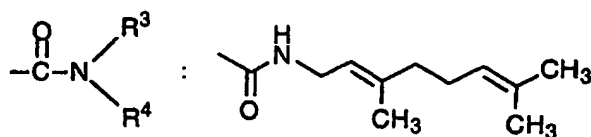
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 155-156

Form: Free

Example 181

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

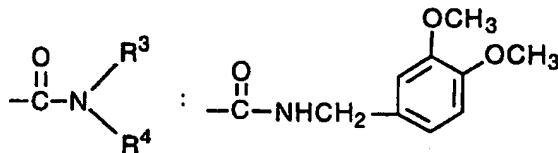
Solvent for recrystal.: n-Hexane/diethyl ether

M.p. (°C): 67-69

Form: Free

Example 182

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Brown powder

Solvent for recrystal.: Ethyl acetate

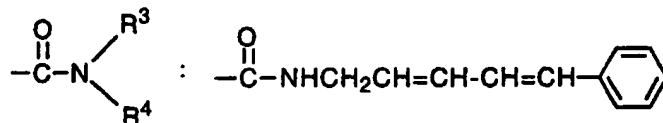
M.p. (°C): 132-133

Form: Free

- 357 -

Example 183

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

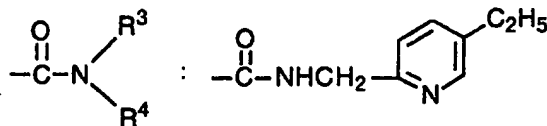
Solvent for recrystal.: Ethanol

M.p. (°C): 174-175

Form: Free

Example 184

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

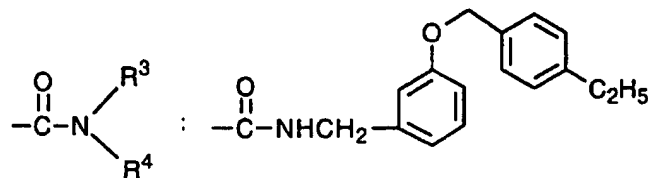
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 156-158

Form: Free

Example 185

Structure:

R¹: HR²: CH₃

m: 0

n: 0

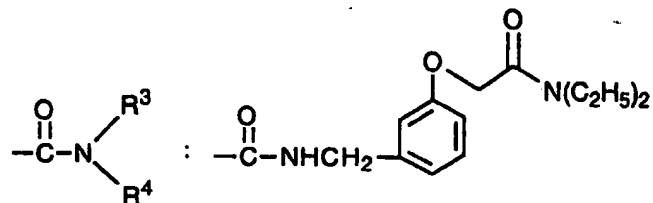
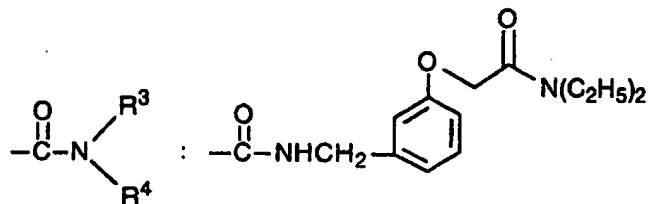
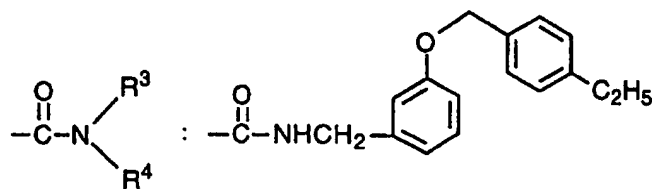
Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 102-103

Form: Free

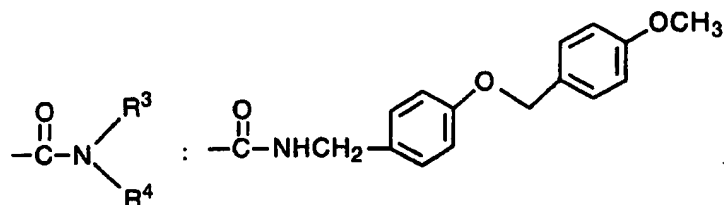
- 358 -

Example 186**Structure:****R¹: H****R²: CH₃****m: 0****n: 0****Crystalline form: Yellow oil****Form: Free****Example 187****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Yellow oil****Form: Free****Example 188****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 123-124****Form: Free**

- 359 -

Example 189

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: White powder

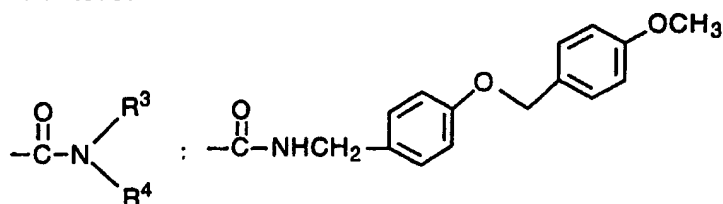
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 149-151

Form: Free

Example 190

Structure:

R¹: HR²: CH₃

m: 0

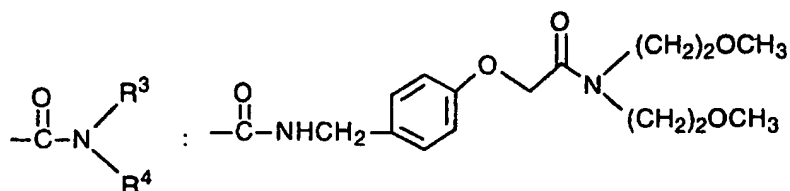
n: 0

Crystalline form: Yellow powder

Form: Free

Example 191

Structure:

R¹: HR²: CH₃

m: 1

n: 0

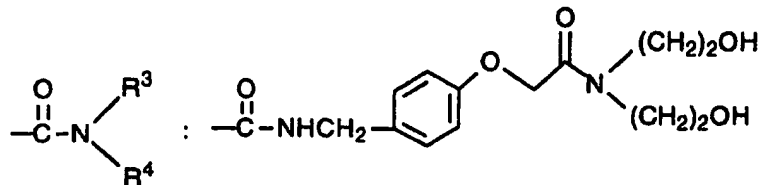
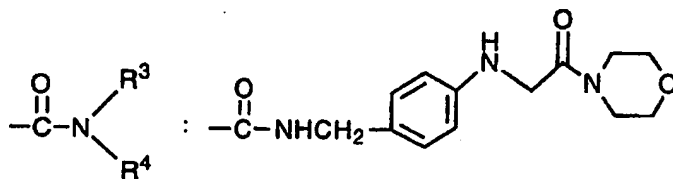
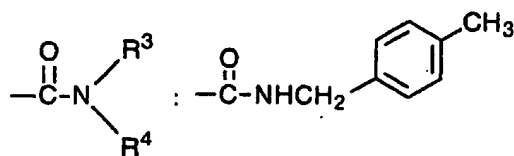
Crystalline form: Colorless prisms

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 122-123

Form: Free

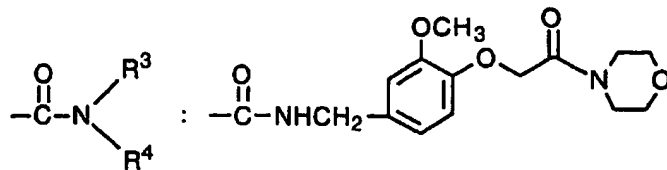
- 360 -

Example 192**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: White powder****Solvent for recrystal.: Methanol/diethyl ether****M.p. (°C): 110-112****Form: Free****Example 193****Structure:****R¹: H****R²: CH₃****m: 0****n: 0****Crystalline form: Yellow needles****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 193-195****Form: Free****Example 194****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****Crystalline form: Colorless needles****Solvent for recrystal.: Diisopropyl ether****M.p. (°C): 152-153****Form: Free**

- 361 -

Example 195

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: White powder

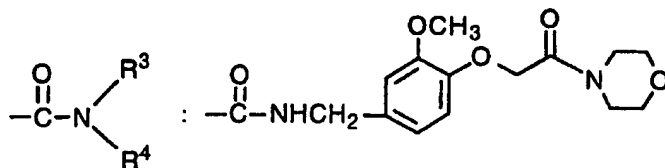
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 164-165

Form: Free

Example 196

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Yellow granules

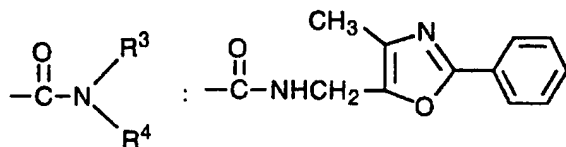
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 144-145

Form: Free

Example 197

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

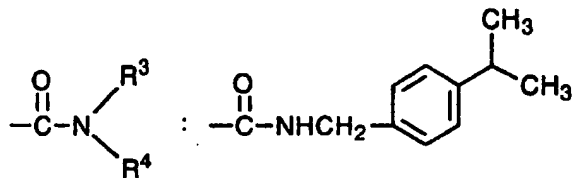
M.p. (°C): 195-196

Form: Free

- 362 -

Example 198

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

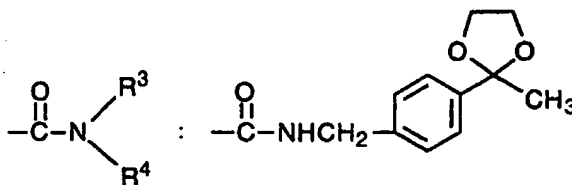
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 105-107

Form: Free

Example 199

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow flakes

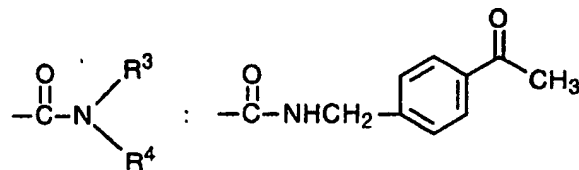
Solvent for recrystal.: Ethanol

M.p. (°C): 159-160

Form: Free

Example 200

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

Solvent for recrystal.: Ethanol

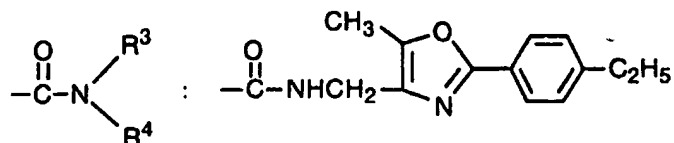
M.p. (°C): 165-167

Form: Free

- 363 -

Example 201

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

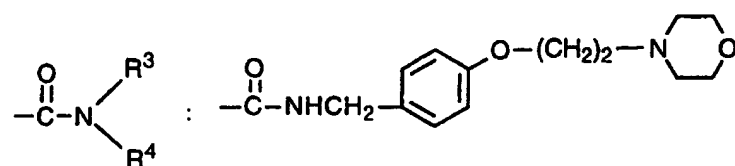
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 195-196

Form: Free

Example 202

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Yellow powder

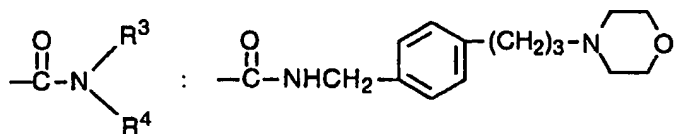
Solvent for recrystal.: Ethanol/diethyl ether

M.p. (°C): 155-158 (decomposed)

Form: Hydrochloride

Example 203

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Yellow granules

Solvent for recrystal.: Ethanol/diethyl ether

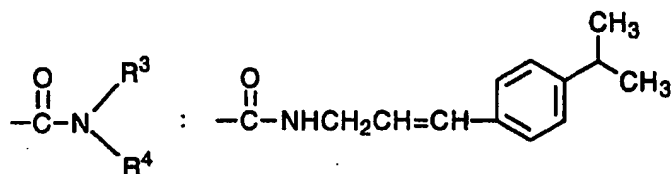
M.p. (°C): 116-118

Form: Hydrochloride

- 364 -

Example 204

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

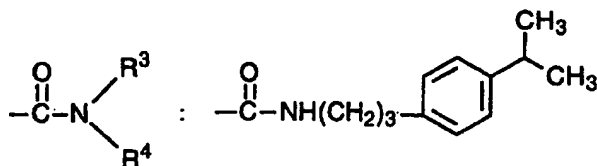
Solvent for recrystal.: Ethanol

M.p. (°C): 118-120

Form: Free

Example 205

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

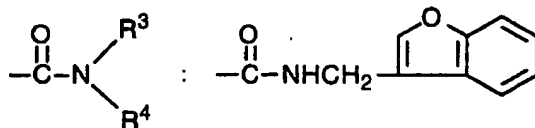
Solvent for recrystal.: Ethanol

M.p. (°C): 56-58

Form: Free

Example 206

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Pale brown prisms

Solvent for recrystal.: Isopropanol/water

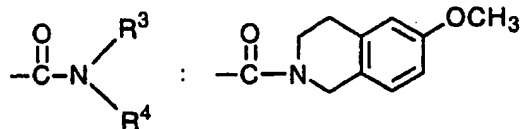
M.p. (°C): 133-134

Form: Free

- 365 -

Example 207

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: White powder

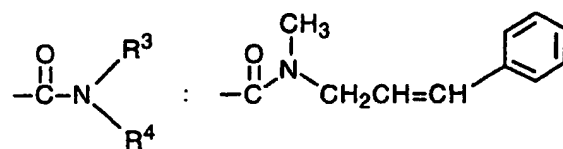
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 170-171

Form: Free

Example 208

Structure:

R¹: HR²: CH₃

m: 0

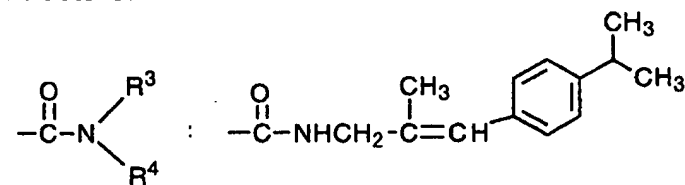
n: 0

Crystalline form: Pale yellow oil

Form: Free

Example 209

Structure:

R¹: HR²: CH₃

m: 1

n: 0

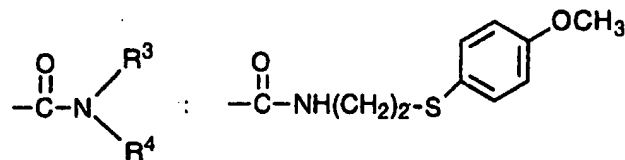
Crystalline form: Colorless oil

Form: Free

- 366 -

Example 210

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

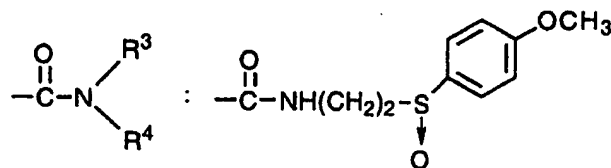
Solvent for recrystal.: Ethanol

M.p. (°C): 76-77

Form: Free

Example 211

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

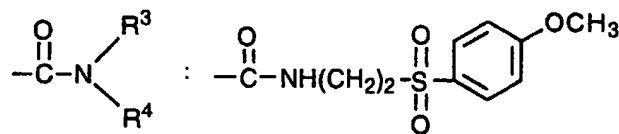
Solvent for recrystal.: Ethanol

M.p. (°C): 156-157

Form: Free

Example 212

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

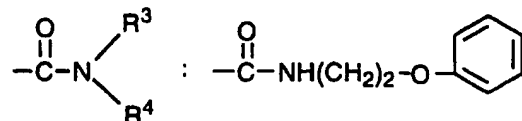
M.p. (°C): 148-150

Form: Free

- 367 -

Example 213

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow prisms

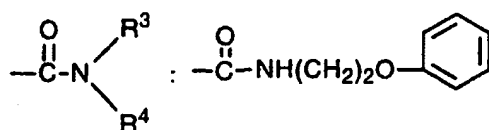
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 113-114

Form: Free

Example 214

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

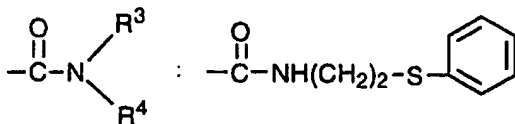
Solvent for recrystal.: Ethanol/water

M.p. (°C): 115-116

Form: Free

Example 215

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol/water

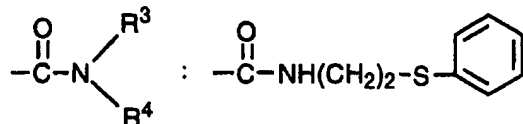
M.p. (°C): 87-88

Form: Free

- 368 -

Example 216

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

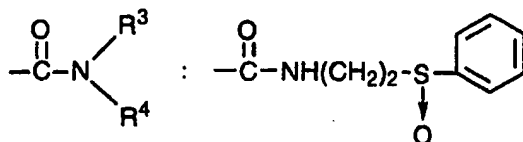
Solvent for recrystal.: Ethanol

M.p. (°C): 107-109

Form: Free

Example 217

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

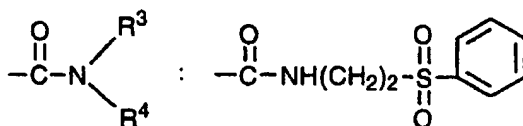
Solvent for recrystal.: Ethanol/water

M.p. (°C): 132-133

Form: Free

Example 218

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

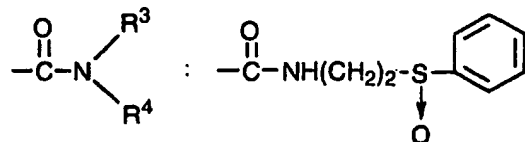
M.p. (°C): 162-163

Form: Free

- 369 -

Example 219

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

Crystalline form: Colorless needles

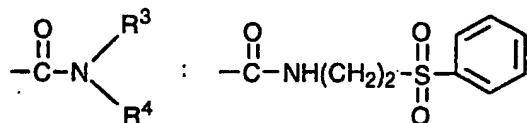
Solvent for recrystal.: Ethanol

M.p. ($^{\circ}\text{C}$): 156-157

Form: Free

Example 220

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

Crystalline form: Colorless needles

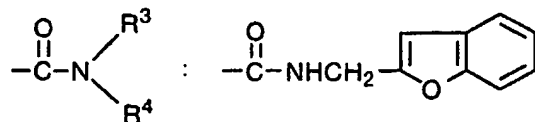
Solvent for recrystal.: Ethanol

M.p. ($^{\circ}\text{C}$): 181-182

Form: Free

Example 221

Structure:

 R^1 : H R^2 : CF_3

m: 0

n: 0

Crystalline form: Colorless needles

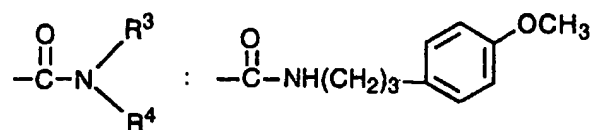
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. ($^{\circ}\text{C}$): 155-157Form: Free

- 370 -

Example 222

Structure:

R¹: HR²: CF₃

m: 0

n: 0

Crystalline form: Colorless needles

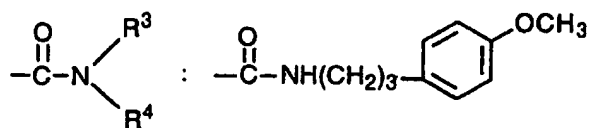
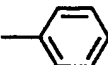
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 115-116

Form: Free

Example 223

Structure:

R¹: HR²: 

m: 0

n: 0

Crystalline form: Colorless granules

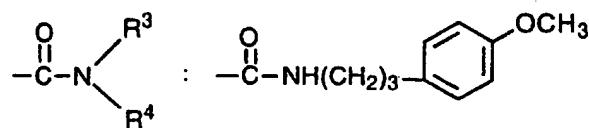
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 150-151

Form: Free

Example 224

Structure:

R¹: HR²: H

m: 1

n: 0

Crystalline form: Pale yellow flakes

Solvent for recrystal.: Ethanol

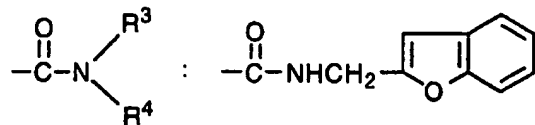
M.p. (°C): 126

Form: Free

- 371 -

Example 225

Structure:

R¹: HR²: H

m: 0

n: 0

Crystalline form: Colorless flakes

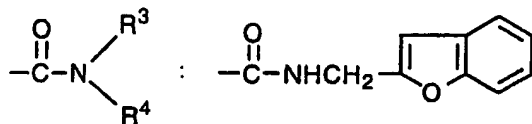
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 155-156

Form: Free

Example 226

Structure:

R¹: HR²: H

m: 1

n: 0

Crystalline form: Pale brown flakes

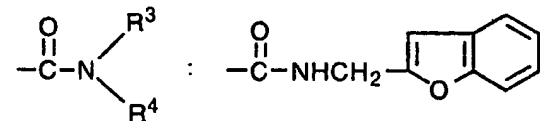
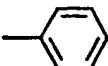
Solvent for recrystal.: Acetonitrile

M.p. (°C): 211-213

Form: Free

Example 227

Structure:

R¹: HR²: 

m: 0

n: 0

Crystalline form: Brown granules

Solvent for recrystal.: n-Hexane/ethyl acetate

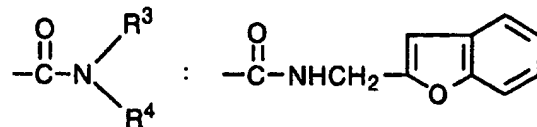
M.p. (°C): 169-171

Form: Free

- 372 -

Example 228

Structure:

R¹: HR²: -CH(CH₃)₂

m: 1

n: 0

Crystalline form: Colorless needles

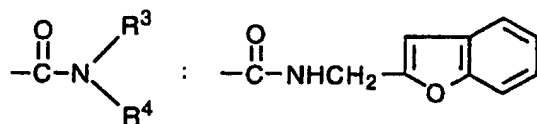
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 114-116

Form: Free

Example 229

Structure:

R¹: HR²: -C₂H₅

m: 1

n: 0

Crystalline form: Colorless prisms

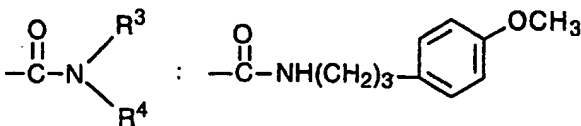
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 114-115

Form: Free

Example 230

Structure:

R¹: HR²: -C₂H₅

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

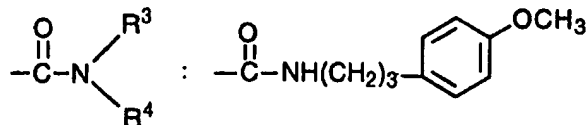
M.p. (°C): 87-89

Form: Free

- 373 -

Example 231

Structure:

R¹: HR²: -CH(CH₃)₂

m: 0

n: 0

Crystalline form: Colorless needles

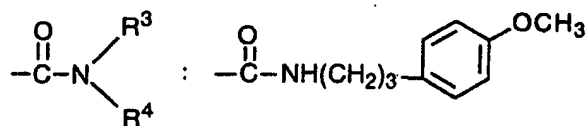
Solvent for recrystal.: n-Hexane

M.p. (°C): 67-68

Form: Free

Example 232

Structure:

R¹: HR²: -C₂H₅

m: 0

n: 0

Crystalline form: Pale yellow prisms

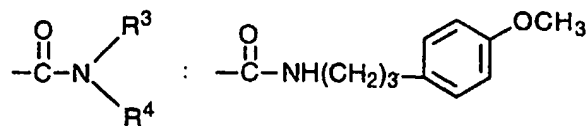
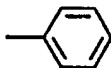
Solvent for recrystal.: n-Hexane

M.p. (°C): 82-83

Form: Free

Example 233

Structure:

R¹: HR²: 

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

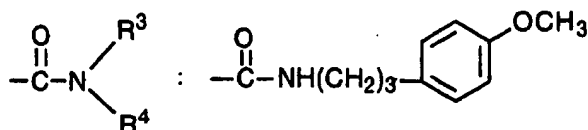
M.p. (°C): 157-158

Form: Free

- 374 -

Example 234

Structure:

R¹: HR²: H

m: 0

n: 0

Crystalline form: Yellow needles

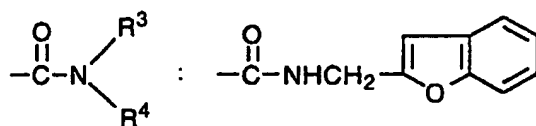
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 92-93

Form: Free

Example 235

Structure:

R¹: HR²:

m: 1

n: 0

Crystalline form: Colorless needles

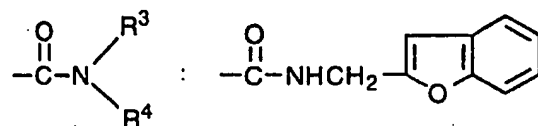
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 173-174

Form: Free

Example 236

Structure:

R¹: 7-ClR²: CH₃

m: 1

n: 0

Crystalline form: Colorless flakes

Solvent for recrystal.: n-Hexane/ethyl acetate

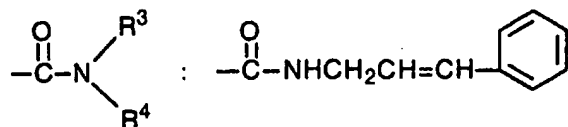

M.p. (°C): 160-161

Form: Free

- 375 -

Example 237

Structure:

R¹: HR²: -CH₂-N

m: 0

n: 0

Crystalline form: White powder

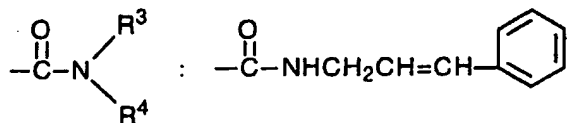

Solvent for recrystal.: Ethanol/diethyl ether

M.p. (°C): 156-158 (decomposed)

Form: Oxalate

Example 238

Structure:

R¹: HR²: -CH₂-N

m: 0

n: 0

Crystalline form: Pale yellow powder

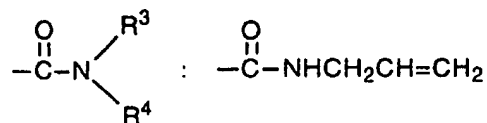
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 118-119

Form: Free

Example 239

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

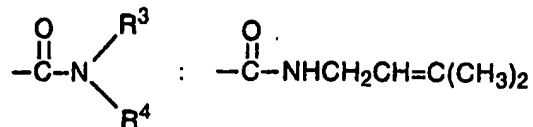
M.p. (°C): 116-118

Form: Free

- 376 -

Example 240

Structure:

R¹: HR²: CH₃

m: 1

n: 0

Crystalline form: Pale yellow needles

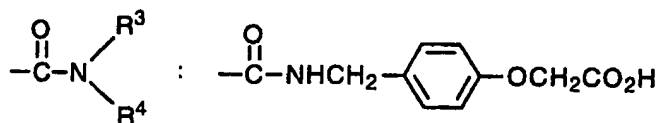
Solvent for recrystal.: Ethanol

M.p. (°C): 112-113

Form: Free

Example 241

Structure:

R¹: HR²: CH₃

m: 0

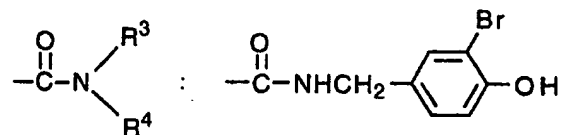
n: 0

Crystalline form: White powder

Form: Free

Example 242

Structure:

R¹: HR²: CH₃

m: 0

n: 0

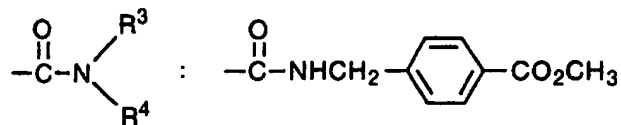
Crystalline form: Yellow powder

Form: Free

- 377 -

Example 243

Structure:

R¹: HR²: CH₃

m: 0

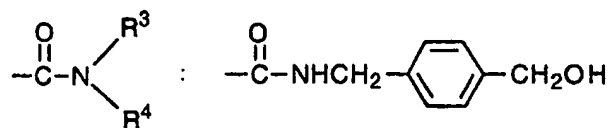
n: 0

Crystalline form: White powder

Form: Free

Example 244

Structure:

R¹: HR²: CH₃

m: 0

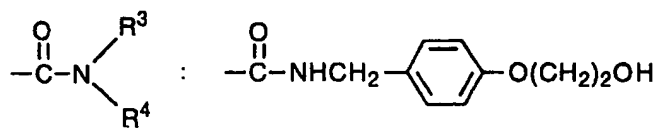
n: 0

Crystalline form: Yellow powder

Form: Free

Example 245

Structure:

R¹: HR²: CH₃

m: 0

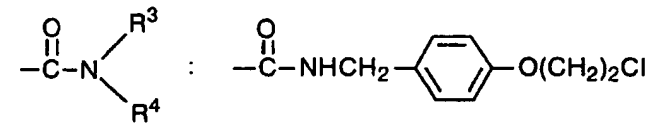
n: 0

Crystalline form: Yellow oil

Form: Free

Example 246

Structure:

R¹: HR²: CH₃

m: 0

n: 0

Crystalline form: Yellow oil

Form: Free

- 378 -

NMR analysis:

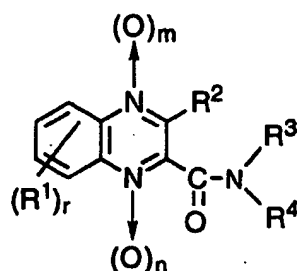
Ex. No.	¹ H-NMR δ ppm:
186	(CDCl ₃); 1.11 (3H, t, J=7 Hz), 1.20 (3H, t, J=7 Hz), 3.17 (3H, s), 3.3 - 3.5 (4H, m), 4.6-4.7 (4H, m), 6.89 (1H, d, J=8 Hz), 7.00 (2H, m), 7.30 (1H, d, J=8 Hz), 7.7-7.9 (2H, m), 8.0-8.1 (2H, m), 8.40 (1H, brs)
187	(CDCl ₃); 1.12 (3H, t, J=7 Hz), 1.21 (3H, t, J=7 Hz), 3.10 (3H, s), 3.3 - 3.5 (4H, m), 4.66 (2H, d, J=7 Hz), 4.68 (2H, s), 6.88 (1H, d, J=8 Hz), 7.0-7.1 (2H, m), 7.29 (1H, d, J=8 Hz), 7.7-7.9 (2H, m), 8.0-8.1 (1H, m), 8.39 (1H, br), 8.5-8.6 (1H, m)
190	(CDCl ₃); 3.17 (3H, s), 3.61 (3H, s), 4.63 (2H, d, J=6 Hz), 4.99 (2H, s), 6.9-7.0 (4H, m), 7.3-7.4 (4H, m), 7.7-7.9 (2H, m), 8.0-8.1 (2H, m), 8.31 (1H, brs)
208	(CDCl ₃); 2.78, 2.79 (3H, s), 2.92, 3.24 (3H, s), 3.98, 4.43 (2H, d, J=6 Hz), 6.10-6.40 (1H, m), 6.40, 6.70 (1H, d, J=16 Hz), 7.20-7.50 (5H, m), 7.70-7.85 (2H, m), 8.00-8.15 (2H, m),
209	(CDCl ₃); 8.56 (1H, m), 8.20 (1H, brt, J=6 Hz), 8.06 (1H, m), 7.77 (2H, m), 7.21 (4H, m), 6.51 (1H, s), 4.22 (2H, d, J=6 Hz), 3.07 (3H, s), 2.90 (1H, sept, J=7 Hz), 1.98 (3H, s), 1.25 (6H, d, J=7 Hz)
245	(CDCl ₃); 2.25 (1H, br), 3.17 (3H, s), 3.9-4.1 (4H, m), 4.63 (2H, d, J=6 Hz), 6.92 (2H, d, J=7 Hz), 7.34 (2H, d, J=7 Hz), 7.7-7.9 (2H, m), 8.0 - 8.1 (2H, m), 8.34 (1H, br)
52	(CDCl ₃); 3.09 (3H, s), 3.40-3.55 (2H, m), 3.55-3.85 (6H, m), 3.90 (2H, s), 4.78 (2H, d, J=6 Hz), 6.60 (1H, s), 6.65 (1H, d, J=7 Hz), 6.67 (1H, s), 7.28 (1H, d, J=7 Hz), 7.75-7.85 (2H, m), 8.05-8.15 (1H, m), 8.47 (1H, brs), 8.50-8.60 (1H, m)
104	(CDCl ₃); 8.05 (3H, m), 7.78 (2H, m), 7.25 (5H, m), 3.56 (2H, q, J=7 Hz), 3.14 (3H, s), 2.77 (2H, t, J=7 Hz), 2.04 (2H, qui, J=7 Hz)
106	(CDCl ₃); 8.05 (3H, m), 7.78 (2H, m), 7.15 (2H, d, J=9 Hz), 6.84 (2H, d, J=9 Hz), 3.76 (3H, s), 3.54 (2H, q, J=7 Hz), 3.14 (3H, s), 2.72 (2H, t, J=7 Hz), 2.00 (2H, qui, J=7 Hz)

- 379 -

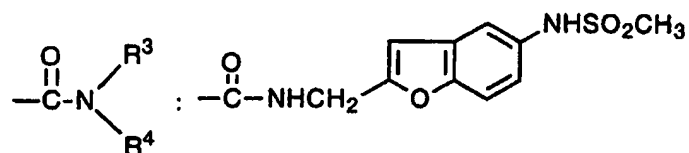
5	107	(CDCl ₃); 8.03 (3H, m), 7.79 (2H, m), 7.11 (2H, d, J=9 Hz), 6.69 (2H, d, J=9 Hz), 3.54 (2H, q, J=7 Hz), 3.14 (3H, s), 2.88 (6H, s), 2.69 (2H, t, J=7 Hz), 1.99 (2H, qui, J=7 Hz)
	111	(CDCl ₃); 1.62 (3H, s), 1.69 (3H, s), 1.77 (3H, s), 2.0-2.2 (4H, m), 3.15 (3H, s), 4.12 (2H, t, J=6 Hz), 5.11 (1H, br), 5.36 (1H, br), 7.7-8.2 (4H, m), 7.92 (1H, br)
	135	(DMSO-d ₆); 1.75-1.90 (2H, m), 2.54 (2H, t, J=7 Hz), 2.63 (3H, s), 2.83 (6H, s), 3.25-3.35 (2H, m), 6.67 (2H, d, J=9 Hz), 7.06 (2H, d, J=9 Hz), 7.85-7.96 (2H, m), 8.10-8.20 (1H, m), 8.40-8.50 (1H, m), 8.87 (1H, brs)
10	246	(CDCl ₃); 3.17 (3H, s), 3.82 (2H, t, J=6 Hz), 4.24 (2H, t, J=6 Hz), 4.64 (2H, d, J=6 Hz), 6.93 (2H, d, J=9 Hz), 7.35 (2H, d, J=9 Hz), 7.7-7.9 (2H, m), 8.0-8.1 (2H, m), 8.33 (1H, br)
	241	(DMSO-d ₆); 2.83 (3H, s), 4.48 (2H, d, J=6 Hz), 4.66 (2H, s), 6.91 (2H, d, J=9 Hz), 7.33 (2H, d, J=9 Hz), 7.8-8.0 (2H, m), 8.0-8.2 (2H, m), 9.33 (1H, t, J=6 Hz)
	242	(CDCl ₃); 3.17 (3H, s), 4.61 (2H, d, J=6 Hz), 5.91 (1H, brs), 7.00 (1H, d, J=8 Hz), 7.26 (1H, dd, J=2 Hz, J=8 Hz), 7.52 (1H, d, J=2 Hz), 7.7 - 7.9 (2H, m), 8.0-8.1 (2H, m), 8.40 (1H, brs)
15	243	(CDCl ₃); 3.17 (3H, s), 3.92 (3H, s), 4.77 (2H, d, J=6 Hz), 7.48 (2H, d, J=8 Hz), 7.7-7.9 (2H, m), 8.0-8.1 (2H, m), 8.04 (2H, d, J=8 Hz), 8.51 (1H, brs)
	244	(CDCl ₃); 1.75 (1H, t, J=6 Hz), 4.70 (4H, d, J=6 Hz), 7.3-7.5 (4H, m), 7.7-7.9 (2H, m), 8.0-8.1 (2H, m), 8.39 (1H, brs)

Using the suitable starting compounds, there are obtained the compounds as listed in Table 6 in the same manner as in Examples 1 to 4.

- 380 -

Table 6**Example 247**

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow powder

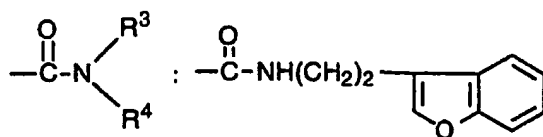
Solvent for recrystal.: Ethanol

M.p. (°C): 206-208

Form: Free

Example 248

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

Solvent for recrystal.: Ethanol

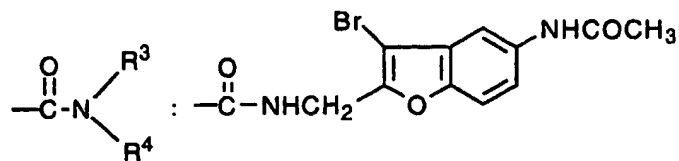
M.p. (°C): 142-144

Form: Free

- 381 -

Example 249

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

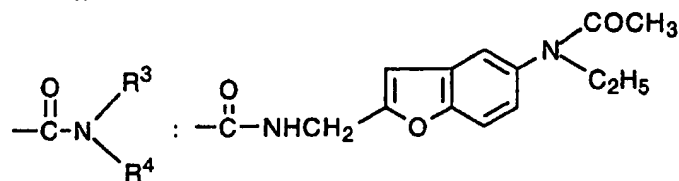
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 213-214

Form: Free

Example 250

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless granules

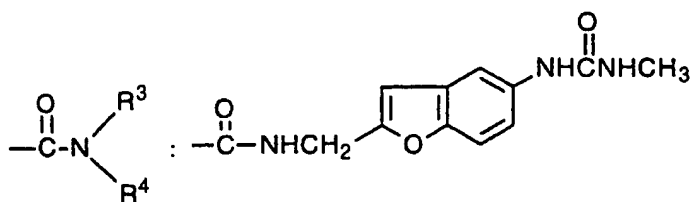
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 160-162

Form: Free

Example 251

Structure:

R¹: HR²: CH₃

m: 1

n: 0

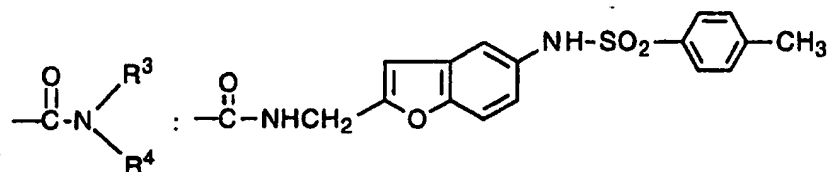
r: 1

Crystalline form: Pale brown powder

M.p. (°C): 235-236 (decomposed)

Form: Free

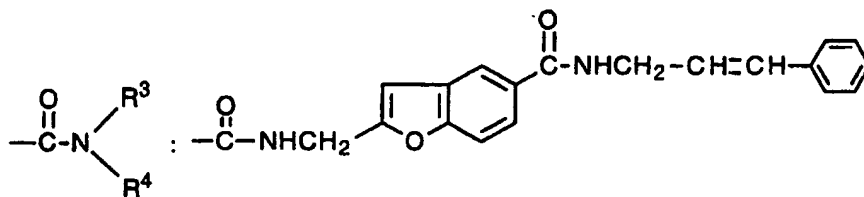
- 382 -

Example 252**Structure:** R^1 : H R^2 : CH_3

m: 1

n: 0

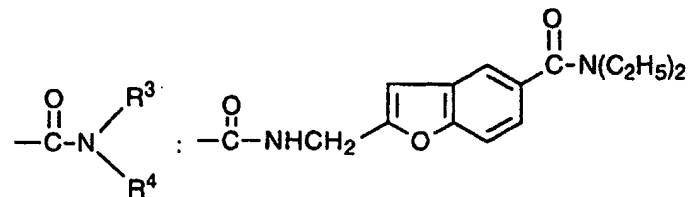
r: 1

Crystalline form: Pale brown powder**Solvent for recrystal.:** Ethanol**M.p. ($^{\circ}\text{C}$):** 198-200**Form:** Free**Example 253****Structure:** R^1 : H R^2 : CH_3

m: 1

n: 0

r: 1

Crystalline form: Pale yellow granules**Solvent for recrystal.:** 2-Propanol**M.p. ($^{\circ}\text{C}$):** 140-141**Form:** Free**Example 254****Structure:** R^1 : H R^2 : CH_3

m: 1

n: 0

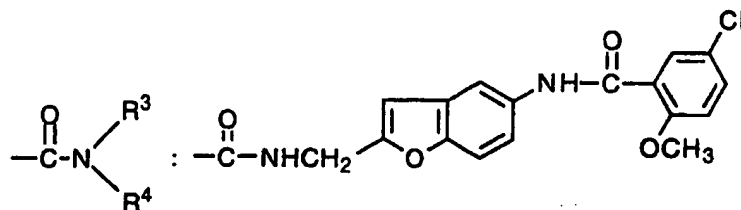
r: 1

Crystalline form: White powder**Solvent for recrystal.:** n-Hexane/ethyl acetate**M.p. ($^{\circ}\text{C}$):** 185-190**Form:** Free

- 383 -

Example 255

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

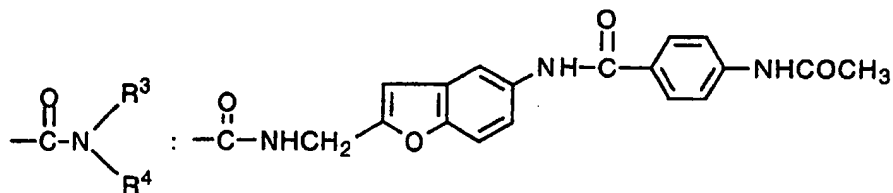
Solvent for recrystal.: Acetonitrile

M.p. (°C): 197-198

Form: Free

Example 256

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow granules

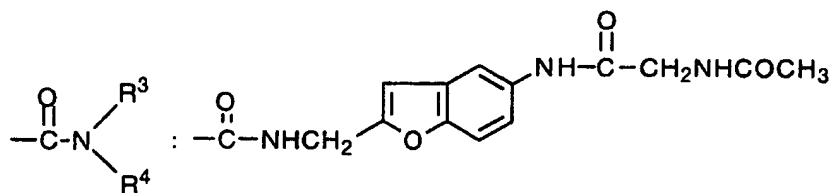
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 255-256 (decomposed)

Form: Free

Example 257

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

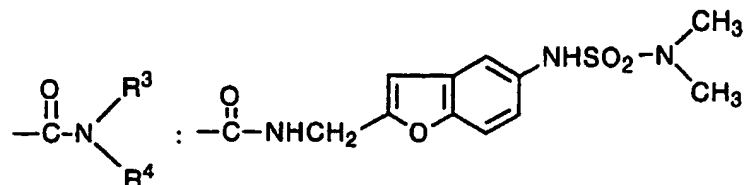
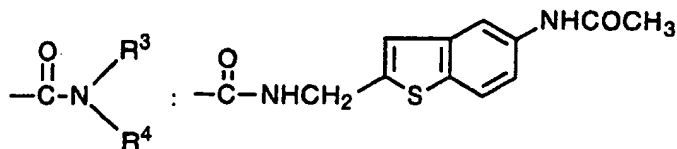
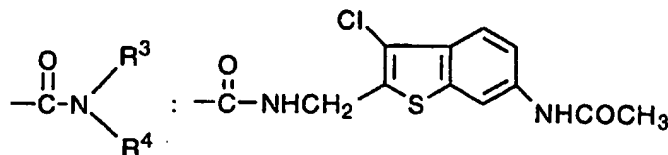
Crystalline form: Pale yellow powder

Solvent for recrystal.: Ethanol

M.p. (°C): 230-231 (decomposed)

Form: Free

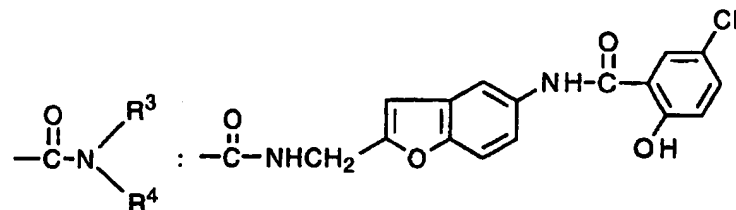
- 384 -

Example 258**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale brown powder****Solvent for recrystal.: Ethanol****M.p. (°C): 142-146****Form: Free****Example 259****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Solvent for recrystal.: Ethanol/water****M.p. (°C): 227-228****Form: Free****Example 260****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow powder****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 248-250 (decomposed)****Form: Free**

- 385 -

Example 261

Structure:

R¹: HR²: CH₃

m: 0

n: 0

r: 1

Crystalline form: White powder

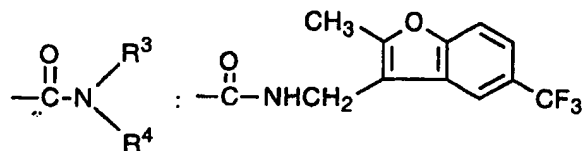
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 234-236

Form: Free

Example 262

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

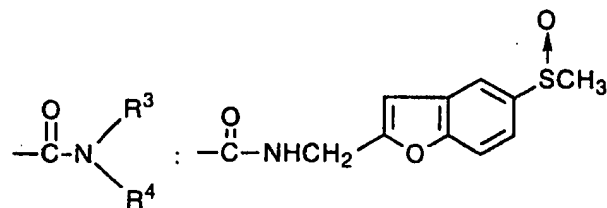
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 193-194

Form: Free

Example 263

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

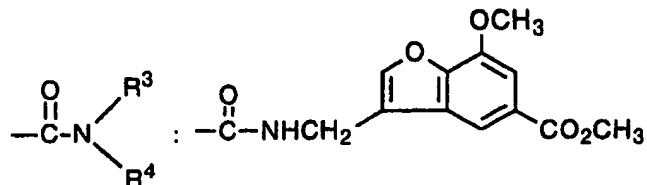
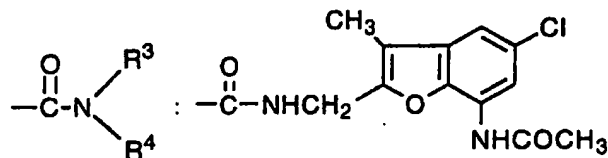
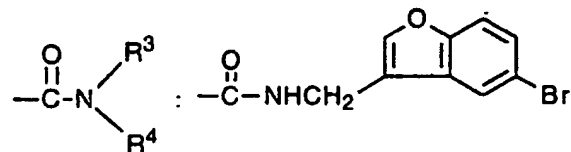
Crystalline form: White powder

Solvent for recrystal.: Ethanol

M.p. (°C): 166-167

Form: Free

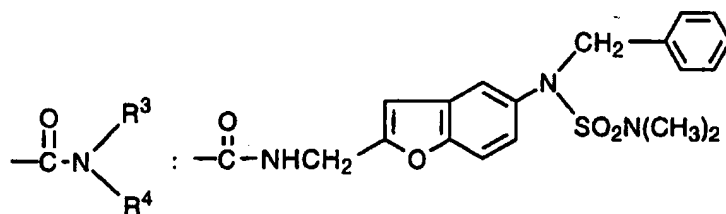
- 386 -

Example 264**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Solvent for recrystal.: Acetonitrile****M.p. (°C): 212-213****Form: Free****Example 265****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow powder****Solvent for recrystal.: Ethanol****M.p. (°C): 246-247 (decomposed)****Form: Free****Example 266****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethanol****M.p. (°C): 197-198****Form: Free**

- 387 -

Example 267

Structure:

R¹: HR²: CH₃

m: 1

n: 0

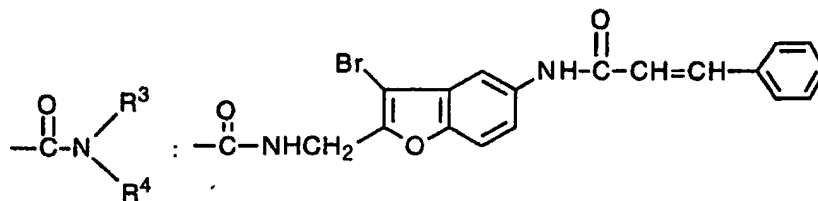
r: 1

Crystalline form: Yellow amorphous

Form: Free

Example 268

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

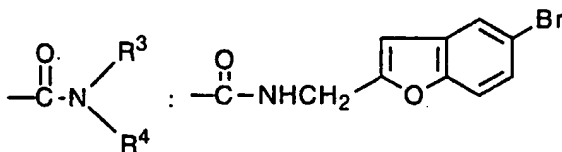
Solvent for recrystal.: Acetonitrile

M.p. (°C): 235-236 (decomposed)

Form: Free

Example 269

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

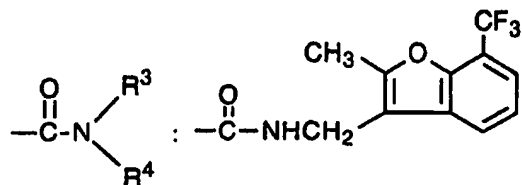
M.p. (°C): 143-147

Form: Free

- 388 -

Example 270

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

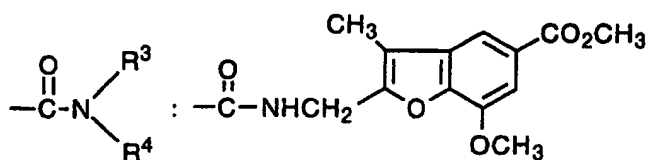
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 175-177

Form: Free

Example 271

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

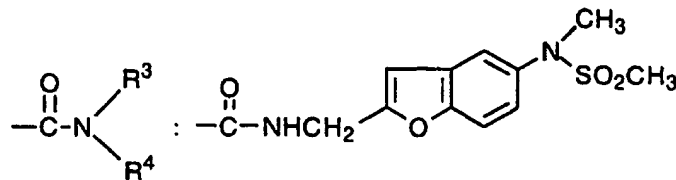
Solvent for recrystal.: Acetonitrile

M.p. (°C): 226-227

Form: Free

Example 272

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow granules

Solvent for recrystal.: Ethanol

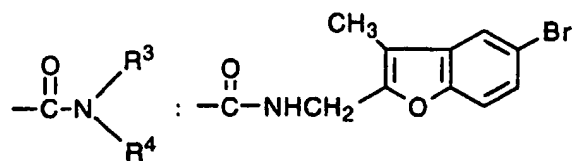
M.p. (°C): 139-144

Form: Free

- 389 -

Example 273

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow granules

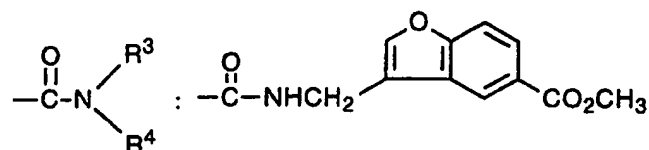
Solvent for recrystal.: Ethanol

M.p. (°C): 184-187

Form: Free

Example 274

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

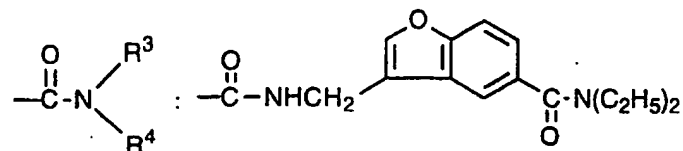
Solvent for recrystal.: Acetonitrile

M.p. (°C): 183-185

Form: Free

Example 275

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

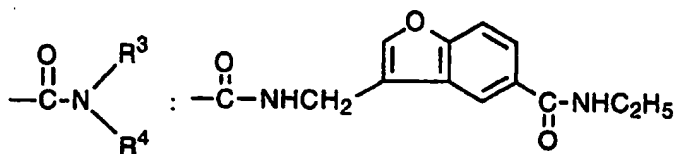
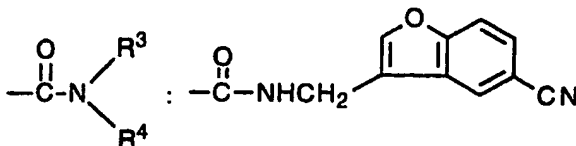
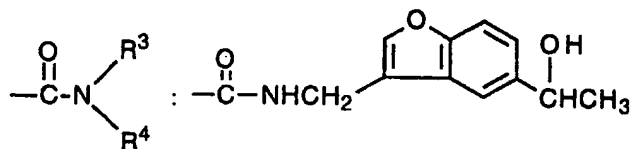
Crystalline form: White powder

Solvent for recrystal.: Diethyl ether

M.p. (°C): 118-120

Form: Free

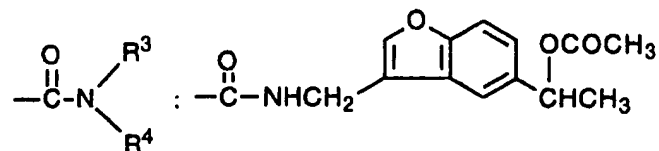
- 390 -

Example 276**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Acetonitrile****M.p. (°C): 217-218****Form: Free****Example 277****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Acetonitrile****M.p. (°C): 213-214****Form: Free****Example 278****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless prisms****Solvent for recrystal.: Ethanol****M.p. (°C): 138-140****Form: Free**

- 391 -

Example 279

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

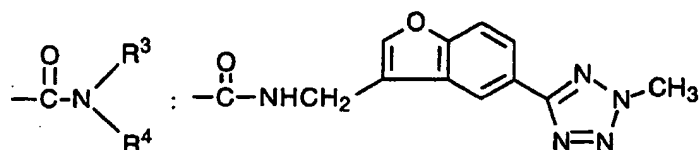
Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. (°C): 121-122

Form: Free

Example 280

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

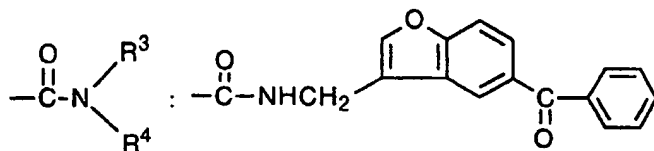
Solvent for recrystal.: Acetonitrile

M.p. (°C): 247-248

Form: Free

Example 281

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

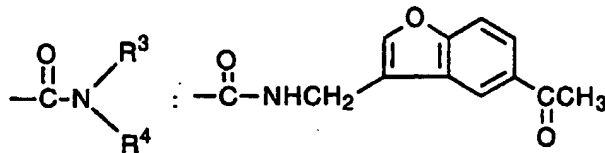
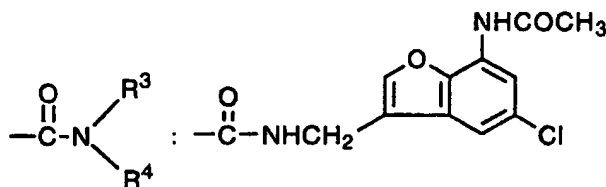
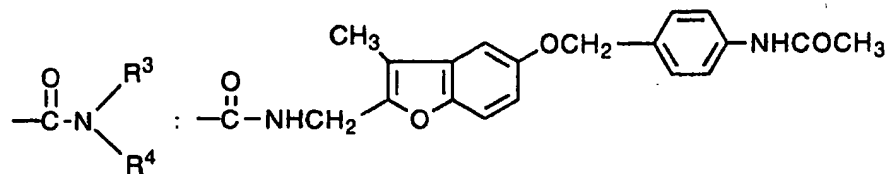
Crystalline form: Pale yellow granules

Solvent for recrystal.: Ethanol

M.p. (°C): 178-180

Form: Free

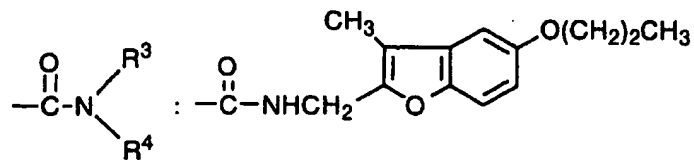
- 392 -

Example 282**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless granules****Solvent for recrystal.: n-Hexane/ethyl acetate****M.p. (°C): 190-191****Form: Free****Example 283****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow powder****Solvent for recrystal.: Ethyl acetate****M.p. (°C): 238-240 (decomposed)****Form: Free****Example 284****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Acetonitrile****M.p. (°C): 221-222****Form: Free**

- 393 -

Example 285

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

r: 1

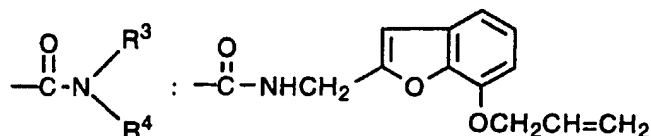
Crystalline form: Colorless needles

Solvent for recrystal.: n-Hexane/ethyl acetate

M.p. ($^{\circ}\text{C}$): 137-138Form: Free

Example 286

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

r: 1

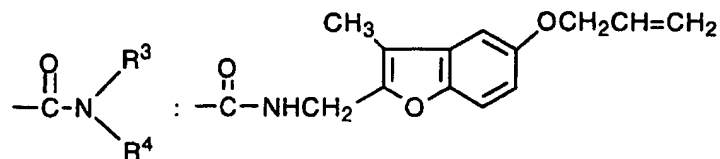
Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

M.p. ($^{\circ}\text{C}$): 144-145Form: Free

Example 287

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

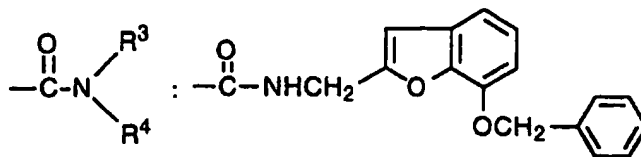
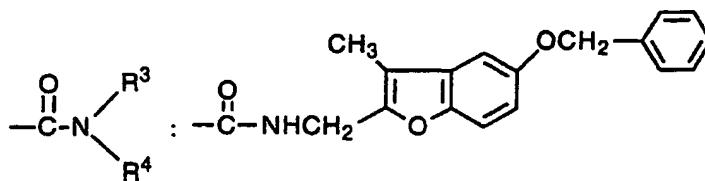
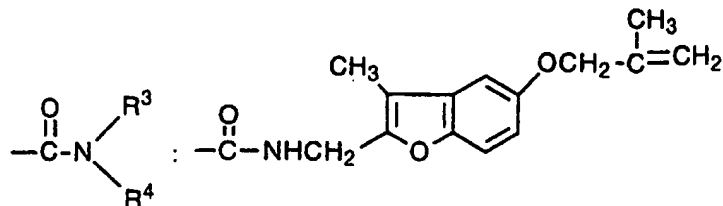
r: 1

Crystalline form: Yellow needles

Solvent for recrystal.: Ethanol

M.p. ($^{\circ}\text{C}$): 70-73Form: Free

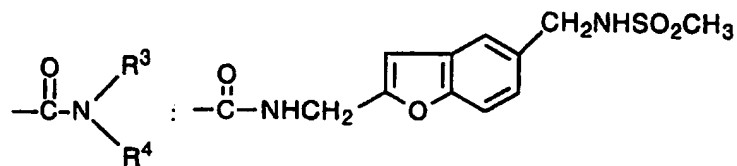
- 394 -

Example 288**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Acetonitrile****M.p. (°C): 189-190****Form: Free****Example 289****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethanol****M.p. (°C): 145-147****Form: Free****Example 290****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 134-135****Form: Free**

- 395 -

Example 291

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless granules

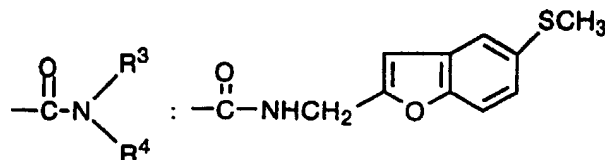
Solvent for recrystal.: Ethanol

M.p. (°C): 174-176

Form: Free

Example 292

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

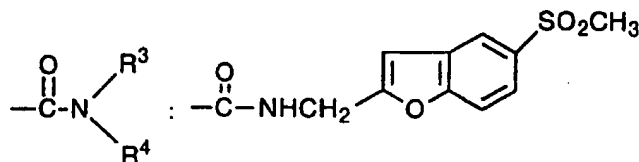
Solvent for recrystal.: Ethanol

M.p. (°C): 160-162

Form: Free

Example 293

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

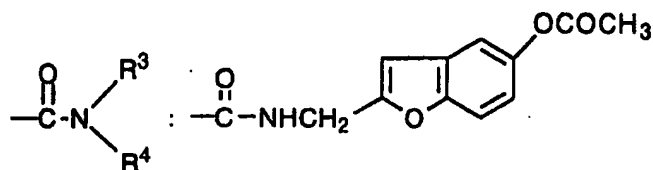
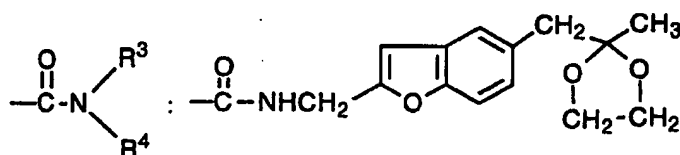
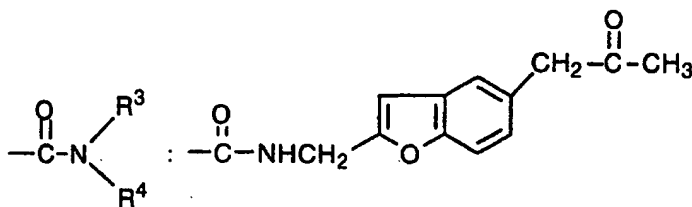
Crystalline form: Colorless needles

Solvent for recrystal.: Ethanol

M.p. (°C): 196-197

Form: Free

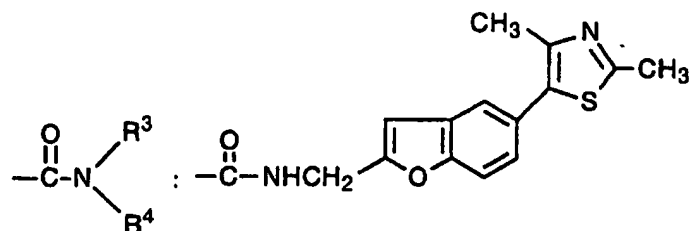
- 396 -

Example 294**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethanol****M.p. (°C): 156-160****Form: Free****Example 295****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****M.p. (°C): 129-131****Form: Free****Example 296****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow needles****Solvent for recrystal.: n-Hexane/ethyl acetate****M.p. (°C): 113-115****Form: Free**

- 397 -

Example 297

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless granules

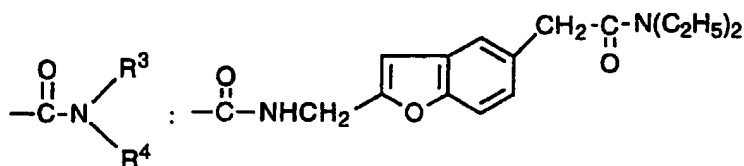
Solvent for recrystal.: Ethanol

M.p. (°C): 187-191

Form: Free

Example 298

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless granules

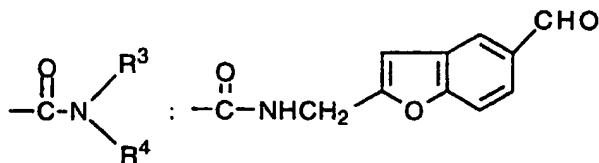
Solvent for recrystal.: Ethanol

M.p. (°C): 145-146

Form: Free

Example 299

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

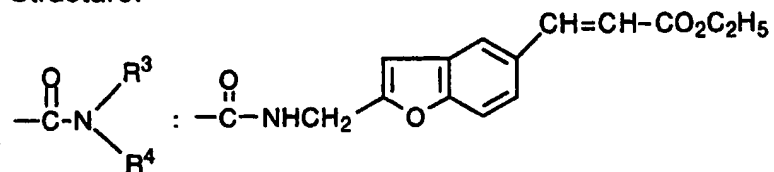
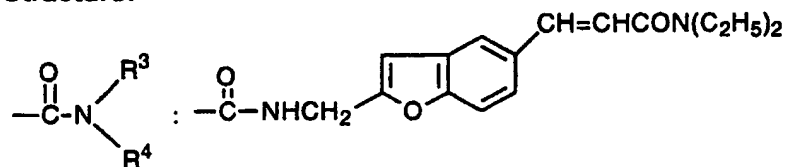
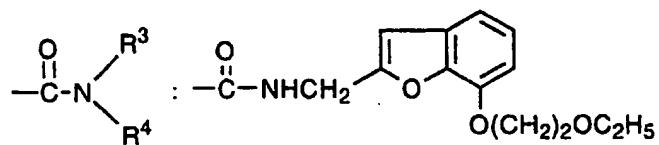
Crystalline form: Pale yellow needles

Solvent for recrystal.: Acetonitrile

M.p. (°C): 184-186

Form: Free

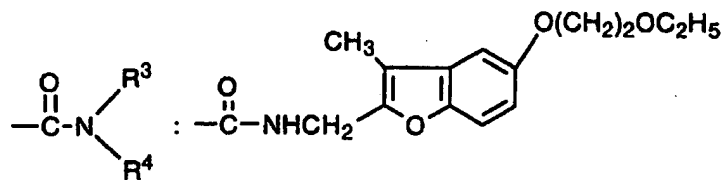
- 398 -

Example 300**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Acetonitrile****M.p. (°C): 162-163****Form: Free****Example 301****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethanol****M.p. (°C): 179-180****Form: Free****Example 302****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale brown granules****Solvent for recrystal.: Ethanol****M.p. (°C): 120-122****Form: Free**

- 399 -

Example 303

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow granules

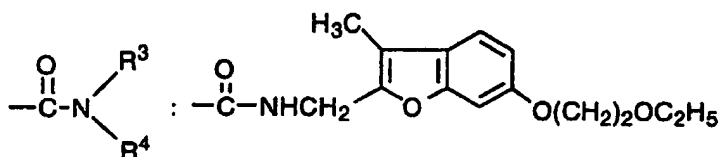
Solvent for recrystal.: Ethanol

M.p. (°C): 103-105

Form: Free

Example 304

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

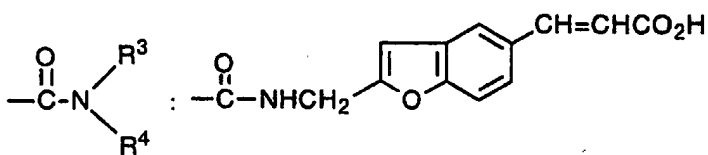
Solvent for recrystal.: Ethanol

M.p. (°C): 123-125

Form: Free

Example 305

Structure:

R¹: HR²: CH₃

m: 1

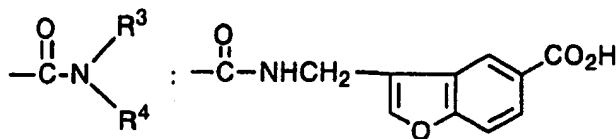
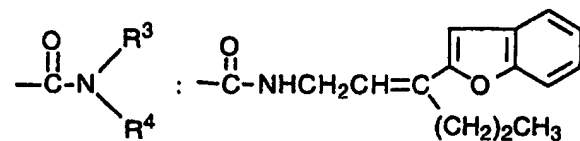
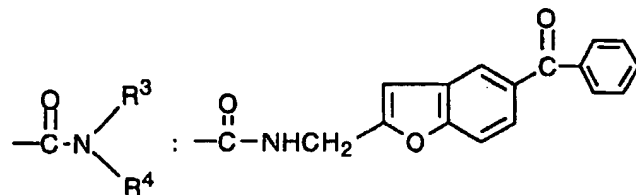
n: 0

r: 1

Crystalline form: Pale yellow powder

Form: Free

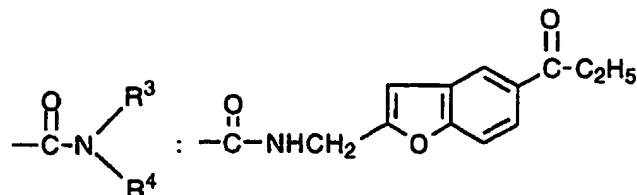
- 400 -

Example 306**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Form: Free****Example 307****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White needles****Solvent for recrystal.: Diethyl ether****M.p. (°C): 103-105****Form: Free****Example 308****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow powder****Solvent for recrystal.: Ethanol****M.p. (°C): 191-193****Form: Free**

- 401 -

Example 309

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

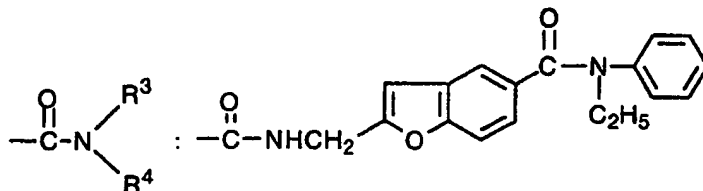
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 141.5-143

Form: Free

Example 310

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow prisms

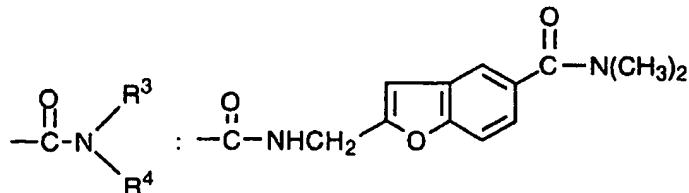
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 162-163

Form: Free

Example 311

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

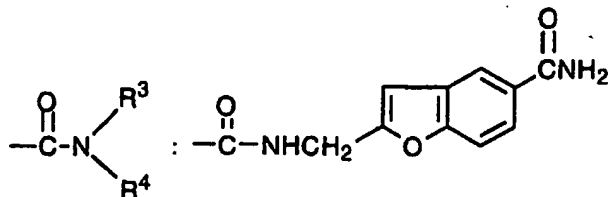
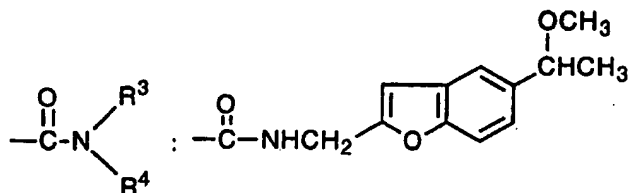
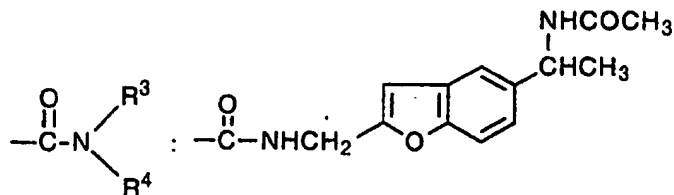
Crystalline form: Pale yellow prisms

Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 178-179

Form: Free

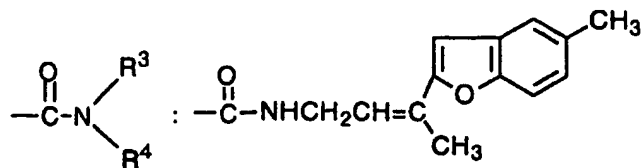
- 402 -

Example 312**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow powder****Solvent for recrystal.: Ethanol****M.p. (°C): 230-231****Form: Free****Example 313****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Solvent for recrystal.: Ethanol****M.p. (°C): 124.5-125****Form: Free****Example 314****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Solvent for recrystal.: Dichloromethane/diethyl ether****M.p. (°C): 198-200****Form: Free**

- 403 -

Example 315

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

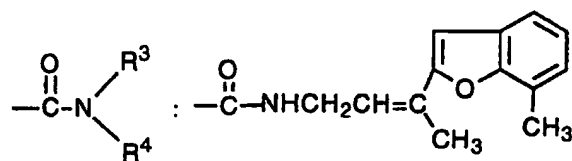
Crystalline form: White needles

Solvent for recrystal.: Dichloromethane/ethanol

Form: Free

Example 316

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White needles

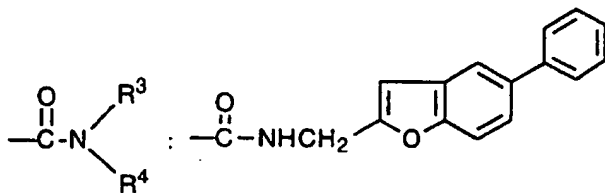
Solvent for recrystal.: Dichloromethane/ethanol

M.p. (°C): 193.5-196

Form: Free

Example 317

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White flakes

Solvent for recrystal.: Dichloromethane/n-hexane

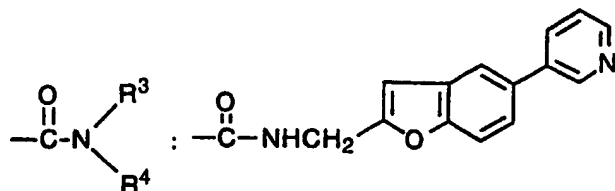
M.p. (°C): 203.5-207.5

Form: Free

- 404 -

Example 318

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow powder

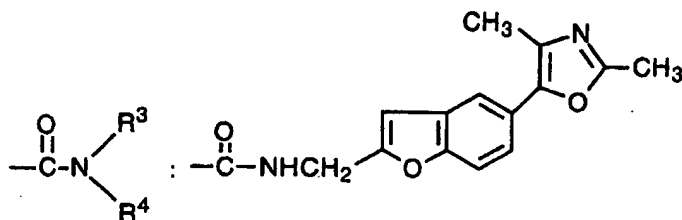
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 162-163

Form: Free

Example 319

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

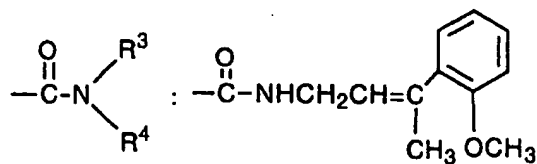
Solvent for recrystal.: Ethanol

M.p. (°C): 191-193

Form: Free

Example 320

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

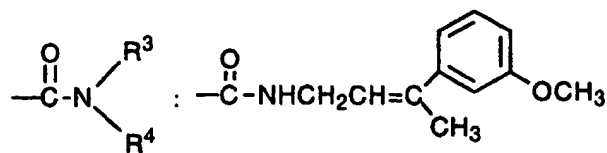
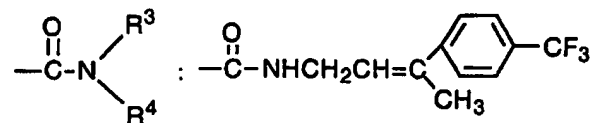
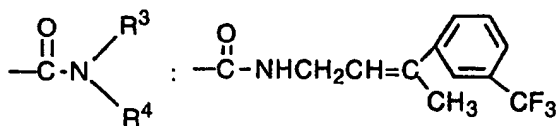
Crystalline form: White needles

Solvent for recrystal.: Dichloromethane/n-hexane

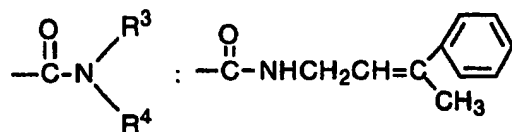
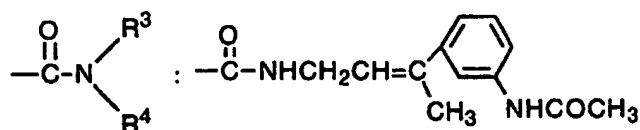
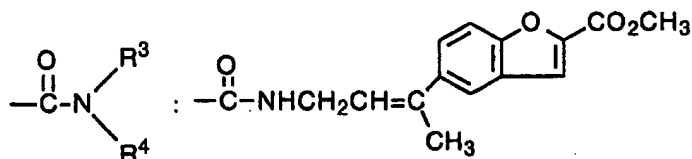
M.p. (°C): 119-120

Form: Free

- 405 -

Example 321**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow flakes****Solvent for recrystal.: Dichloromethane/diethyl ether****M.p. (°C): 86-88****Form: Free****Example 322****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White flakes****Solvent for recrystal.: Dichloromethane/n-hexane****M.p. (°C): 140-142****Form: Free****Example 323****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White needles****Solvent for recrystal.: Dichloromethane/n-hexane****M.p. (°C): 115-117****Form: Free**

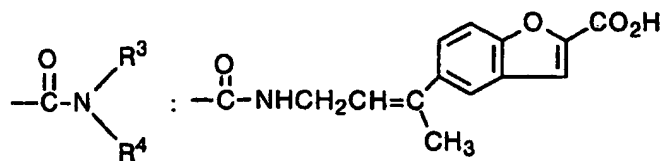
- 406 -

Example 324**Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** White needles**Solvent for recrystal.:** Dichloromethane/n-hexane**M.p. (°C):** 129-133**Form:** Free**Example 325****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** White needles**Solvent for recrystal.:** Dichloromethane/diethyl ether**M.p. (°C):** 177-179**Form:** Free**Example 326****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Pale yellow powder**Solvent for recrystal.:** Dichloromethane/n-hexane**M.p. (°C):** 144-146**Form:** Free

- 407 -

Example 327

Structure:

R¹: HR²: CH₃

m: 1

n: 0

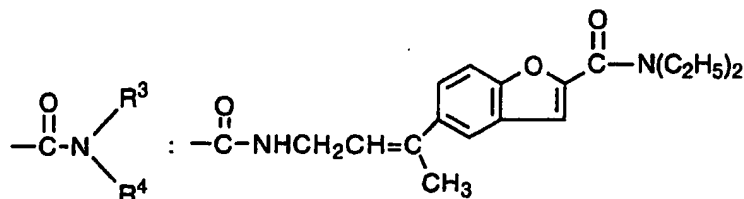
r: 1

Crystalline form: Yellow powder

Form: Free

Example 328

Structure:

R¹: HR²: CH₃

m: 1

n: 0

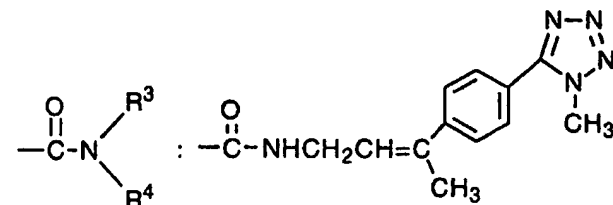
r: 1

Crystalline form: White amorphous

Form: Free

Example 329

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

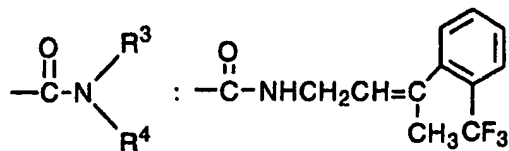
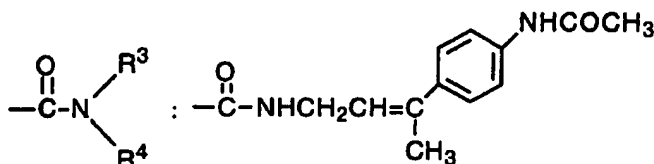
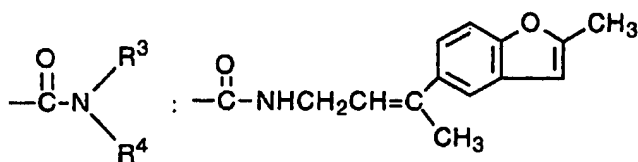
Crystalline form: White needles

Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 173-174

Form: Free

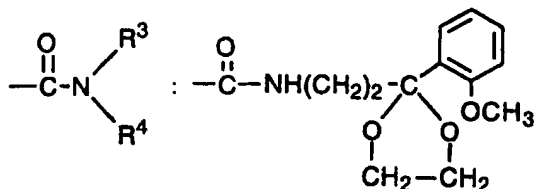
- 408 -

Example 330**Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** White needles**Solvent for recrystal.:** Dichloromethane/n-hexane**M.p. (°C):** 173-175**Form:** Free**Example 331****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Pale yellow powder**Solvent for recrystal.:** Dichloromethane/n-hexane**M.p. (°C):** 193-196**Form:** Free**Example 332****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** White needles**Solvent for recrystal.:** Dichloromethane/n-hexane**M.p. (°C):** 100-101**Form:** Free

- 409 -

Example 333

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White needles

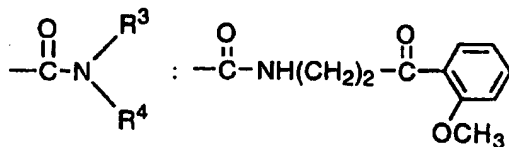
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 151-152

Form: Free

Example 334

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White needles

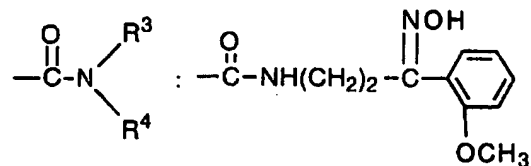
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 141-142

Form: Free

Example 335

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

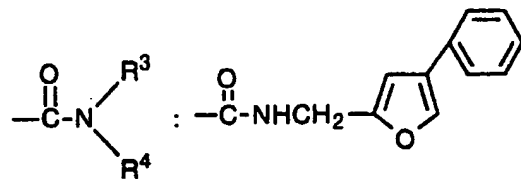
Crystalline form: White amorphous

Form: Free

- 410 -

Example 336

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White needles

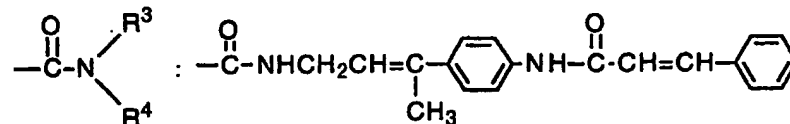
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 143.5-145

Form: Free

Example 337

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow powder

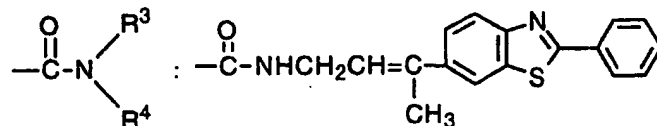
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 217-219

Form: Free

Example 338

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale brown powder

Solvent for recrystal.: Ethanol

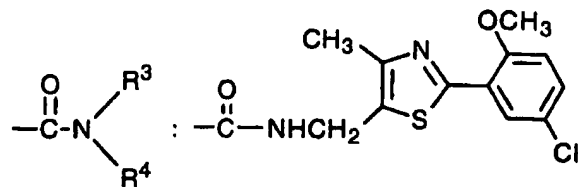
M.p. (°C): 166-168

Form: Free

- 411 -

Example 339

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow powder

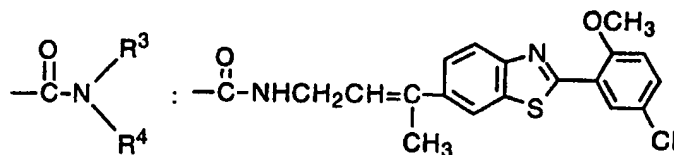
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 223-228

Form: Free

Example 340

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow powder

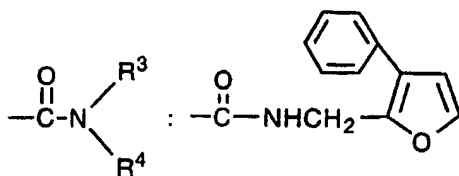
Solvent for recrystal.: Dichloromethane/diethyl ether

M.p. (°C): 228-230

Form: Free

Example 341

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

Solvent for recrystal.: Dichloromethane/n-hexane

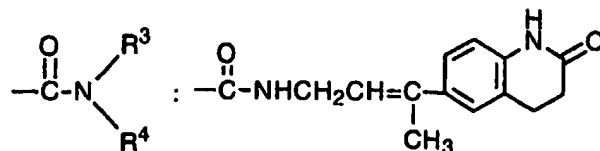
M.p. (°C): 150-151

Form: Free

- 412 -

Example 342

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

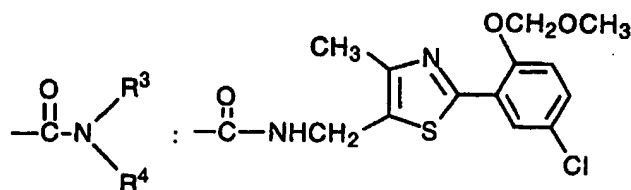
Solvent for recrystal.: Ethanol

M.p. (°C): 237-239

Form: Free

Example 343

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

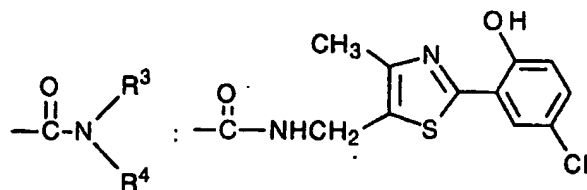
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 180-205

Form: Free

Example 344

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

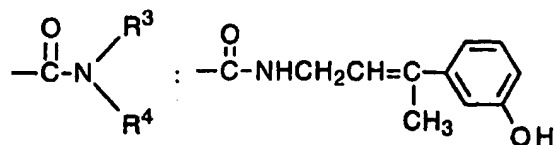
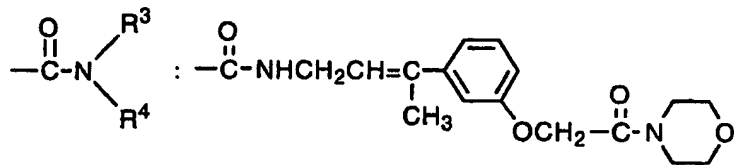
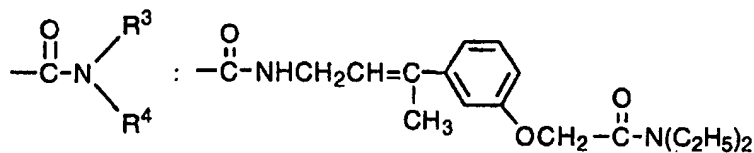
Crystalline form: White powder

Solvent for recrystal.: Methanol/dichloromethane/n-hexane

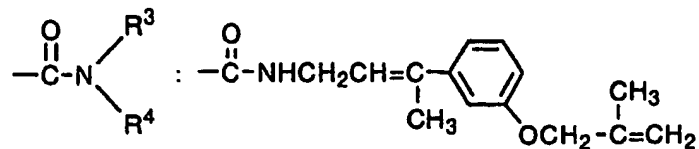
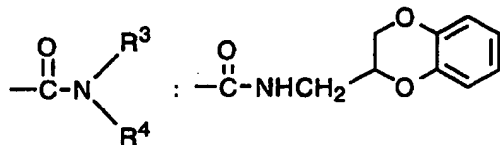
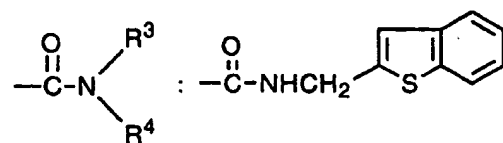
M.p. (°C): 240-243

Form: Free

- 413 -

Example 345**Structure:** $\text{R}^1: \text{H}$ $\text{R}^2: \text{CH}_3$ $m: 1$ $n: 0$ $r: 1$ **Crystalline form: White flakes****Solvent for recrystal.: Methanol/dichloromethane/n-hexane****M.p. (°C): 182.5-186****Form: Free****Example 346****Structure:** $\text{R}^1: \text{H}$ $\text{R}^2: \text{CH}_3$ $m: 1$ $n: 0$ $r: 1$ **Crystalline form: Pale yellow amorphous****Form: Free****Example 347****Structure:** $\text{R}^1: \text{H}$ $\text{R}^2: \text{CH}_3$ $m: 1$ $n: 0$ $r: 1$ **Crystalline form: White amorphous****Form: Free**

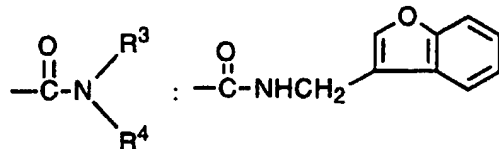
- 414 -

Example 348**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow oil****Form: Free****Example 349****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White flakes****Solvent for recrystal.: Dichloromethane/n-hexane****M.p. (°C): 178.5-180****Form: Free****Example 350****Structure:****R¹: H****R²: -CH₂F****m: 1****n: 0****r: 1****Crystalline form: Pale yellow needles****Solvent for recrystal.: Dichloromethane/n-hexane****M.p. (°C): 153-155****Form: Free**

- 415 -

Example 351

Structure:

R¹: HR²: $\text{-CH}_2\text{F}$

m: 1

n: 0

r: 1

Crystalline form: White powder

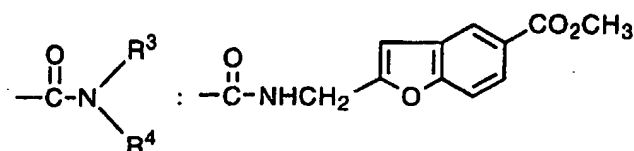
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 126-131

Form: Free

Example 352

Structure:

R¹: HR²: $\text{-CH}_2\text{F}$

m: 1

n: 0

r: 1

Crystalline form: White powder

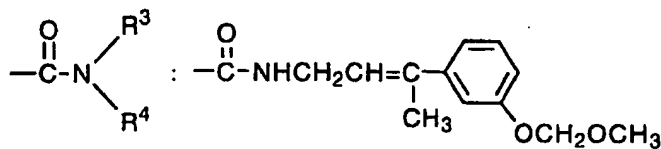
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 111-114

Form: Free

Example 353

Structure:

R¹: HR²: CH_3

m: 1

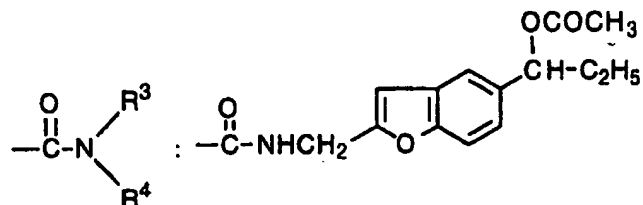
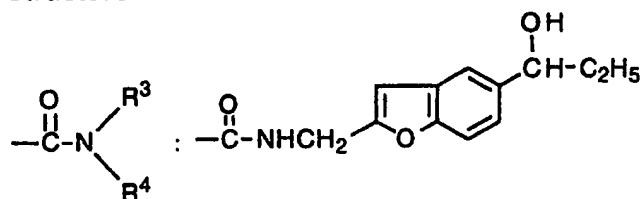
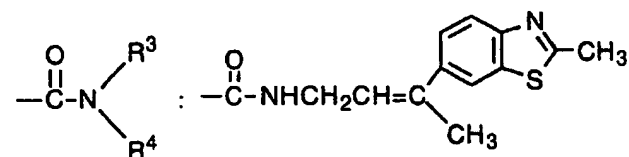
n: 0

r: 1

Crystalline form: Colorless oil

Form: Free

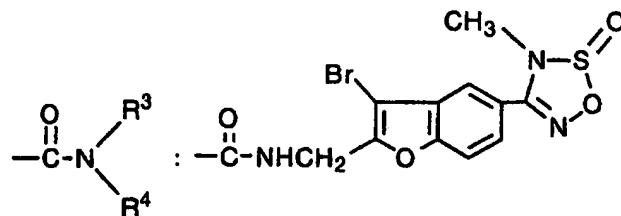
- 416 -

Example 354**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow amorphous****Form: Free****Example 355****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow amorphous****Form: Free****Example 356****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 124.5-128****Form: Free**

- 417 -

Example 357

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

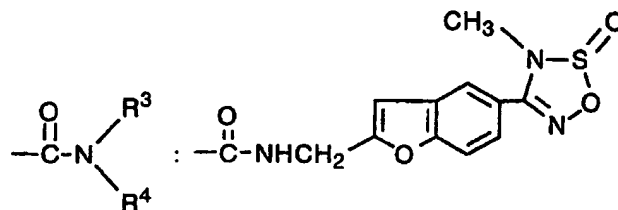
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 129-132

Form: Free

Example 358

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White needles

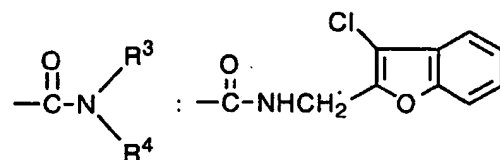
Solvent for recrystal.: Dichloromethane/n-hexane

M.p. (°C): 149-150

Form: Free

Example 359

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow granules

Solvent for recrystal.: Ethyl acetate/n-hexane

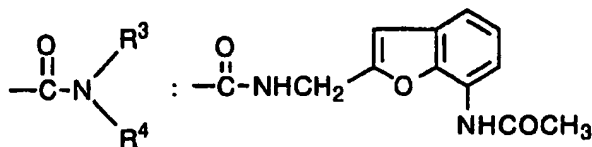
M.p. (°C): 151-153

Form: Free

- 418 -

Example 360

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

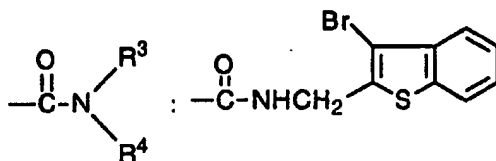
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 237-238

Form: Free

Example 361

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow flakes

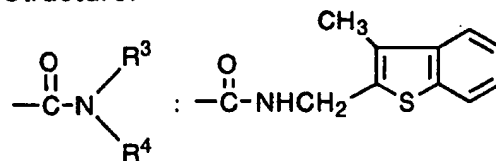
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 160-161

Form: Free

Example 362

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

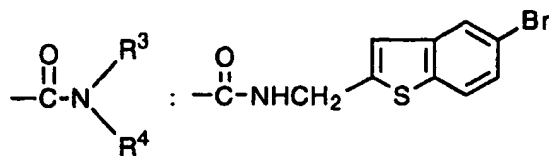
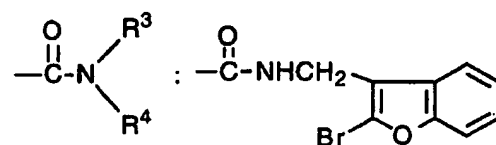
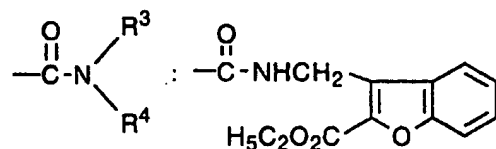
Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate

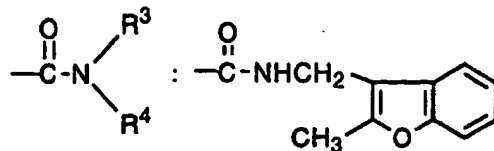
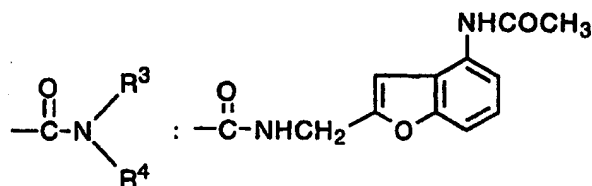
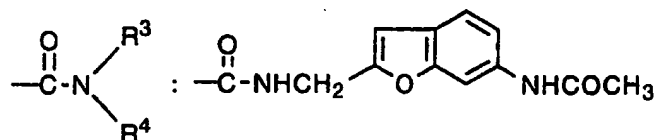
M.p. (°C): 169-170

Form: Free

- 419 -

Example 363**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate****M.p. (°C): 190-191****Form: Free****Example 364****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 180-181****Form: Free****Example 365****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless granules****Solvent for recrystal.: Acetone****M.p. (°C): 173-174****Form: Free**

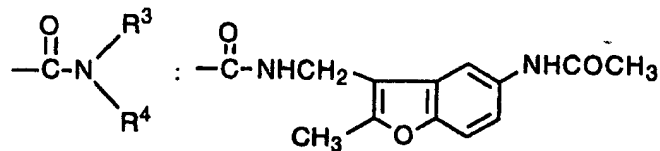
- 420 -

Example 366**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 203-204****Form: Free****Example 367****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow granules****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 250-251****Form: Free****Example 368****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow needles****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 246-247****Form: Free**

- 421 -

Example 369

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

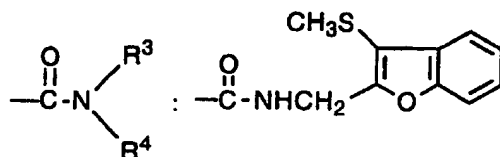
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 247-248

Form: Free

Example 370

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

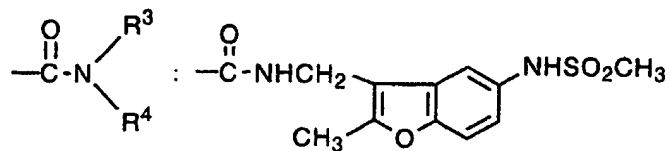
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 160-161

Form: Free

Example 371

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale brown prisms

Solvent for recrystal.: Dimethylformamide/water

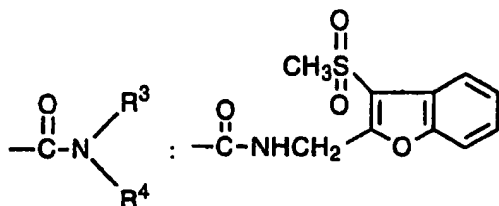
M.p. (°C): 214-215

Form: Free

- 422 -

Example 372

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

r: 1

Crystalline form: Colorless prisms

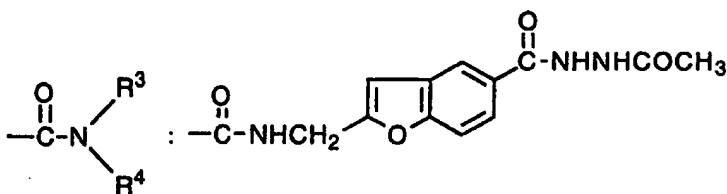
Solvent for recrystal.: Acetone

M.p. ($^{\circ}\text{C}$): 202-203

Form: Free

Example 373

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

r: 1

Crystalline form: Pale yellow powder

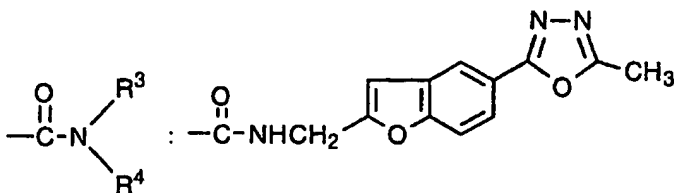
Solvent for recrystal.: Methanol

M.p. ($^{\circ}\text{C}$): 254-255

Form: Free

Example 374

Structure:

 R^1 : H R^2 : CH_3

m: 1

n: 0

r: 1

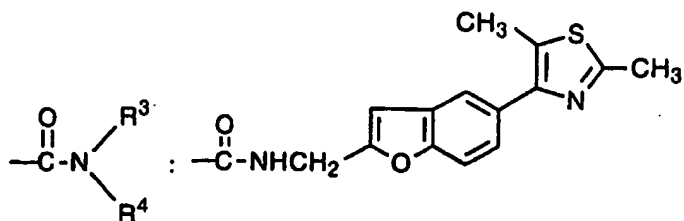
Crystalline form: White powder

Solvent for recrystal.: Dimethylformamide/water

M.p. ($^{\circ}\text{C}$): 201-203Form: Free

Example 375

Structure:



R¹: H

R²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow granules

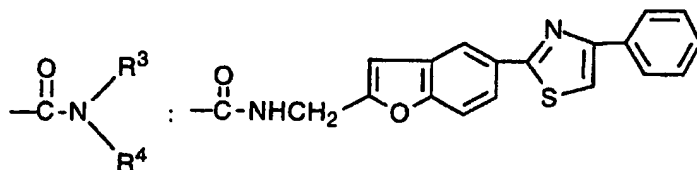
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 161-162

Form: Free

Example 376

Structure:



R¹: H

R²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow needles

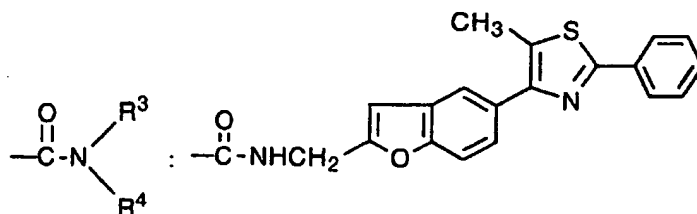
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 197-198

Form: Free

Example 377

Structure:



R¹: H

R²: CH₃

m: 1

n: 0

r: 1

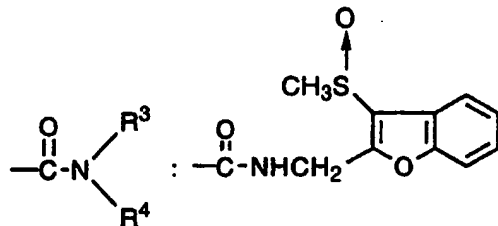
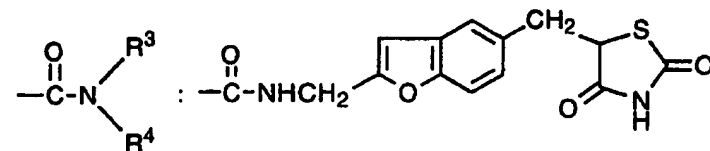
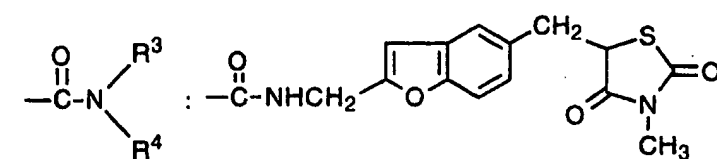
Crystalline form: Pale yellow granules

Solvent for recrystal.: Ethyl acetate/n-hexane

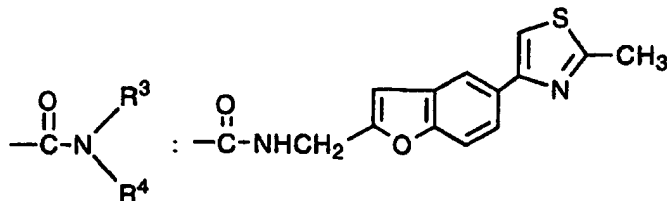
M.p. (°C): 171-172

Form: Free

- 424 -

Example 378**Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Colorless needles**Solvent for recrystal.:** Ethyl acetate**M.p. (°C):** 108-109**Form:** Free**Example 379****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Yellow granules**Solvent for recrystal.:** Ethyl acetate/n-hexane**M.p. (°C):** 117-120**Form:** Free**Example 380****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Pale yellow amorphous**M.p. (°C):** 97-100**Form:** Free

- 425 -

Example 381**Structure:**R¹: HR²: CH₃

m: 1

n: 0

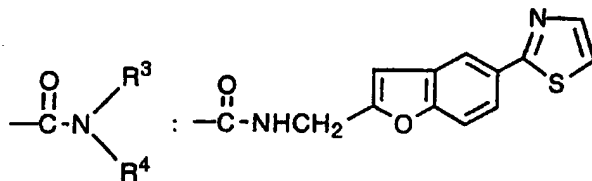
r: 1

Crystalline form: Pale yellow powder

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 148-149

Form: Free

Example 382**Structure:**R¹: HR²: CH₃

m: 1

n: 0

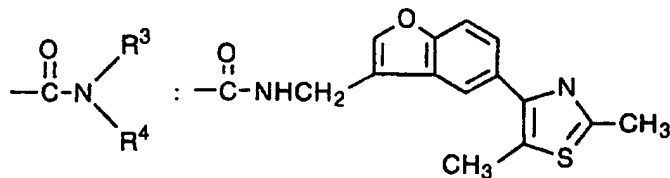
r: 1

Crystalline form: Yellow powder

Solvent for recrystal.: Acetone/n-hexane

M.p. (°C): 156-157

Form: Free

Example 383**Structure:**R¹: HR²: CH₃

m: 1

n: 0

r: 1

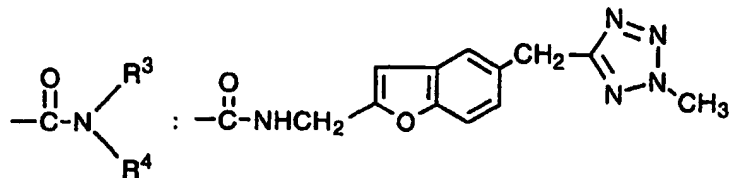
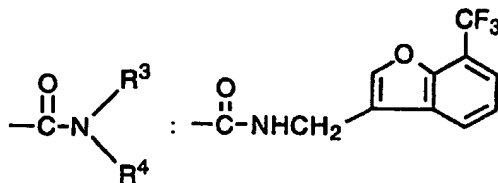
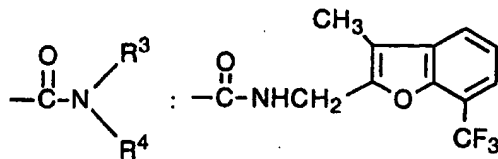
Crystalline form: Yellow granules

Solvent for recrystal.: Ethyl acetate/n-hexane

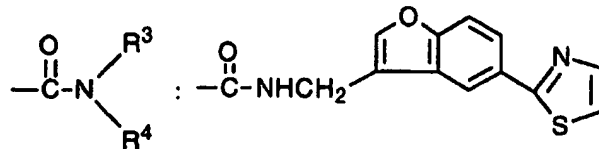
M.p. (°C): 159-160

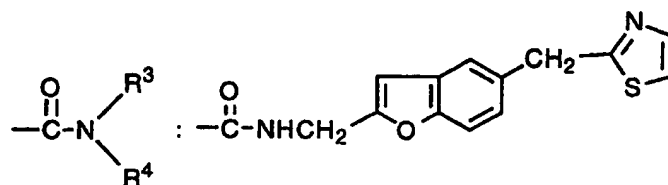
Form: Free

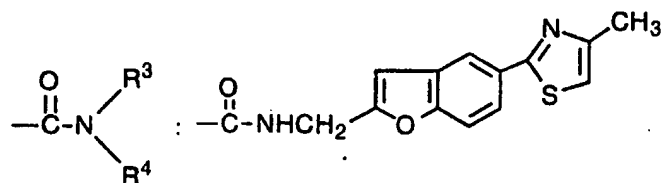
- 426 -

Example 384**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Acetone/n-hexane****M.p. (°C): 177-178****Form: Free****Example 385****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 181-182****Form: Free****Example 386****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 196-197****Form: Free**

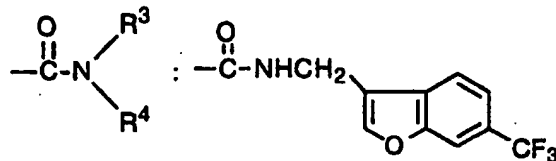
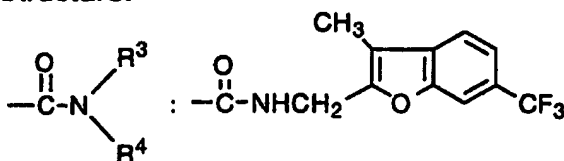
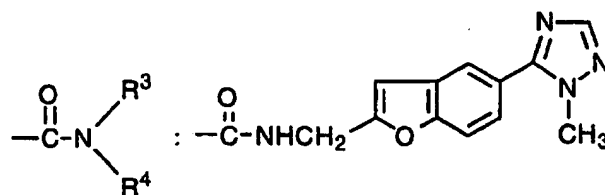
- 427 -

Example 387**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 186-187****Form: Free**

Example 388**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow needles****Solvent for recrystal.: Chloroform/n-hexane****M.p. (°C): 175-176****Form: Free**

Example 389**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethyl acetate****M.p. (°C): 136-138****Form: Free**

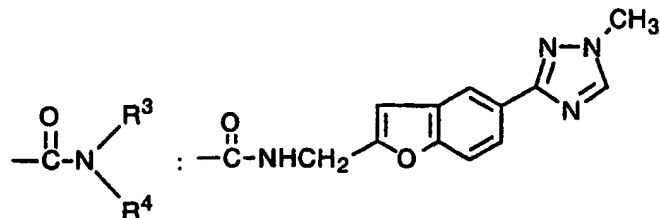
- 428 -

Example 390**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 173-174****Form: Free****Example 391****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless flakes****Solvent for recrystal.: Ethyl acetate/n-hexane****M.p. (°C): 186-187****Form: Free****Example 392****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow flakes****Solvent for recrystal.: Dimethylformamide/water****M.p. (°C): 197-198****Form: Free**

- 429 -

Example 393

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow flakes

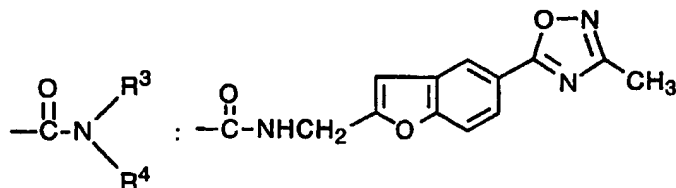
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 230-231

Form: Free

Example 394

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow needles

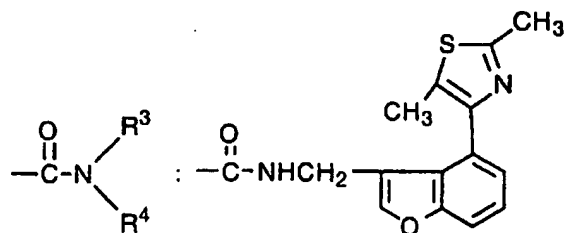
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 225-226

Form: Free

Example 395

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

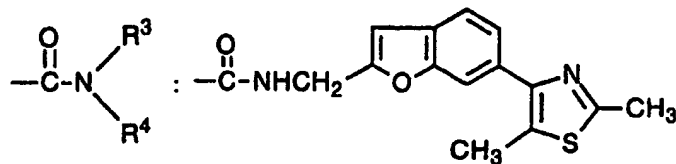
Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 196-197

Form: Free

- 430 -

Example 396**Structure:**R¹: HR²: CH₃

m: 1

n: 0

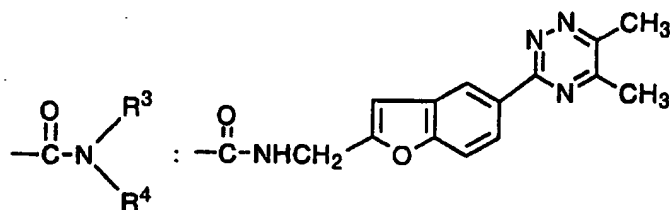
r: 1

Crystalline form: Pale yellow needles

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 160-161

Form: Free

Example 397**Structure:**R¹: HR²: CH₃

m: 1

n: 0

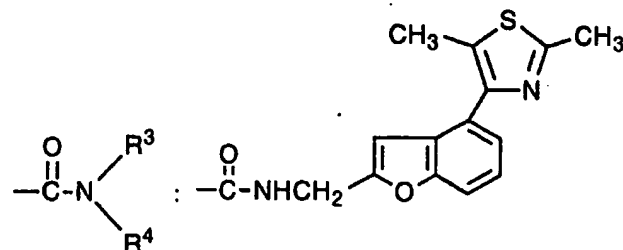
r: 1

Crystalline form: Pale yellow granules

Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 218-220 (decomposed)

Form: Free

Example 398**Structure:**R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

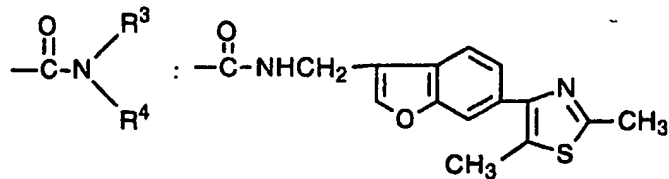
M.p. (°C): 168-169

Form: Free

- 431 -

Example 399

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow prisms

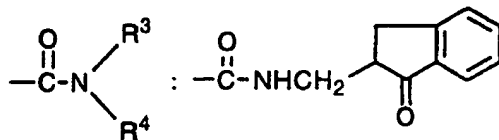
Solvent for recrystal.: Ethanol

M.p. (°C): 202-203

Form: Free

Example 400

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

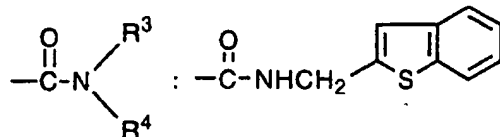
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 159-160

Form: Free

Example 401

Structure:

R¹: 6- and 7-CH₃ R²: CH₃

m: 1

n: 0

r: 2

Crystalline form: Brown needles

Solvent for recrystal.: Chloroform/n-hexane

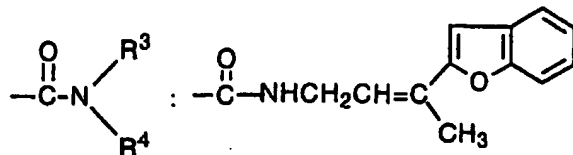
M.p. (°C): 207-208

Form: Free

- 432 -

Example 402

Structure:

R¹: 6- and 7-CH₃ R²: CH₃

m: 1

n: 0

r: 2

Crystalline form: Brown flakes

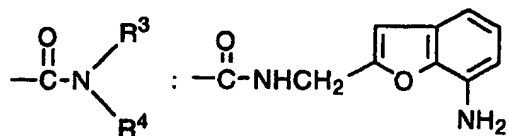
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 189-190

Form: Free

Example 403

Structure:

R¹: HR²: CH₃

m: 1

n: 0

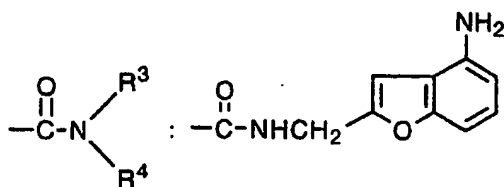
r: 1

Crystalline form: Yellow powder

Form: Free

Example 404

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

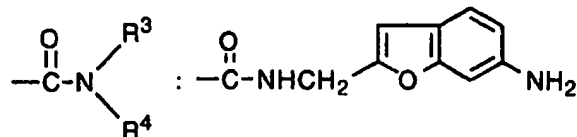
Crystalline form: Yellow powder

Form: Free

- 433 -

Example 405

Structure:

R¹: HR²: CH₃

m: 1

n: 0

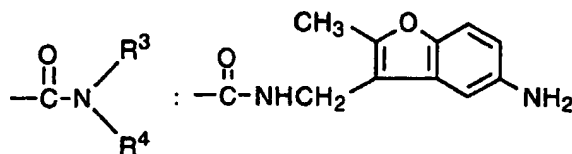
r: 1

Crystalline form: Orange powder

Form: Free

Example 406

Structure:

R¹: HR²: CH₃

m: 1

n: 0

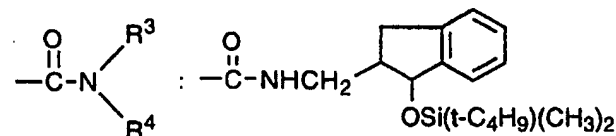
r: 1

Crystalline form: Orange powder

Form: Free

Example 407

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

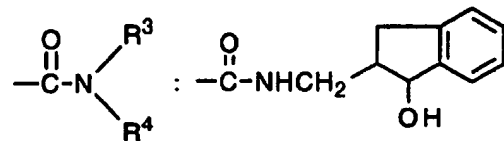
Crystalline form: White powder

Form: Free

- 434 -

Example 408

Structure:

R¹: HR²: CH₃

m: 1

n: 0

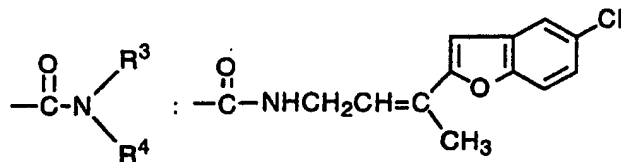
r: 1

Crystalline form: White powder

Form: Free

Example 409

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Brown prisms

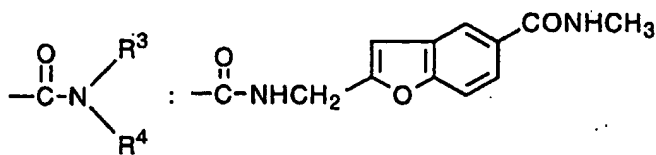
Solvent for recrystal.: Ethanol/dimethylformamide

M.p. (°C): 179-180

Form: Free

Example 410

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

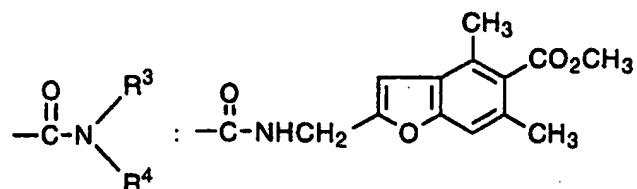
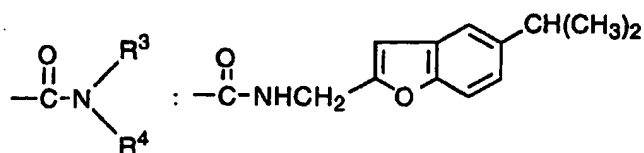
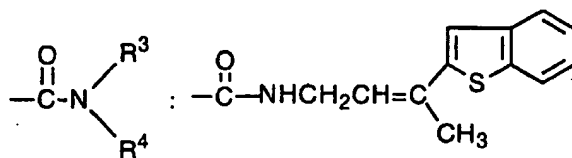
Crystalline form: Pale yellow prisms

Solvent for recrystal.: Ethanol/dimethylformamide

M.p. (°C): 231-233

Form: Free

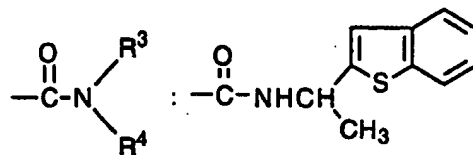
- 435 -

Example 411**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 203-204****Form: Free****Example 412****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 129-130****Form: Free****Example 413****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow prisms****Solvent for recrystal.: Ethanol****M.p. (°C): 177-178****Form: Free**

- 436 -

Example 414

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow powder

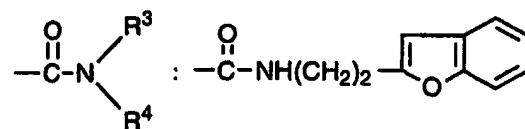
Solvent for recrystal.: Ethanol

M.p. (°C): 120-122

Form: Free

Example 415

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

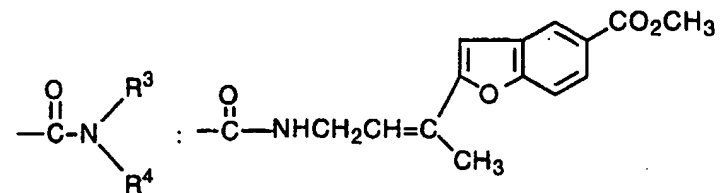
Solvent for recrystal.: Ethanol

M.p. (°C): 142-143

Form: Free

Example 416

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

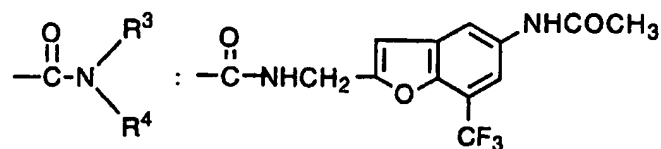
Crystalline form: Pale yellow powder

Solvent for recrystal.: Ethanol/dimethylformamide

M.p. (°C): 189-190

Form: Free

- 437 -

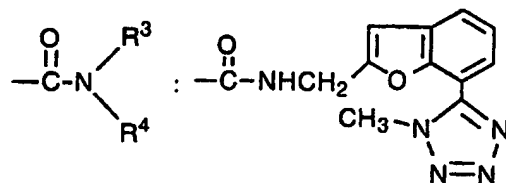
Example 417**Structure:** R^1 : H R^2 : CH_3 m : 1 n : 0 r : 1

Crystalline form: Yellow powder

Solvent for recrystal.: Dimethylformamide

M.p. ($^{\circ}\text{C}$): 236-237

Form: Free

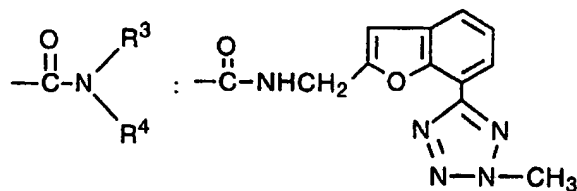
Example 418**Structure:** R^1 : H R^2 : CH_3 m : 1 n : 0 r : 1

Crystalline form: Pale yellow prisms

Solvent for recrystal.: Dimethylformamide

M.p. ($^{\circ}\text{C}$): 229-230

Form: Free

Example 419**Structure:** R^1 : H R^2 : CH_3 m : 1 n : 0 r : 1

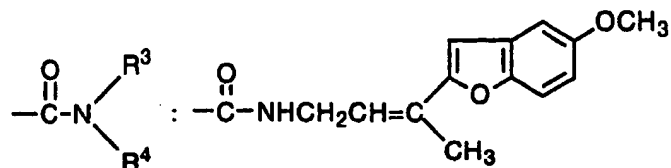
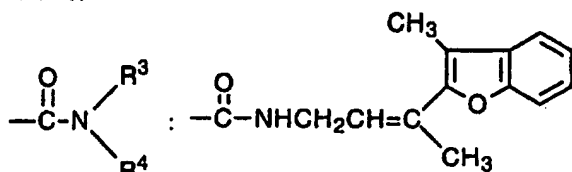
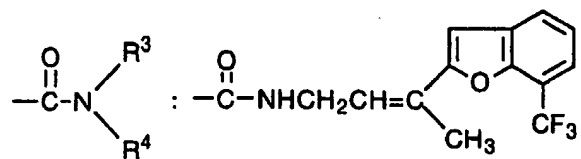
Crystalline form: Yellow powder

Solvent for recrystal.: Ethanol/dimethylformamide

M.p. ($^{\circ}\text{C}$): 233-234

Form: Free

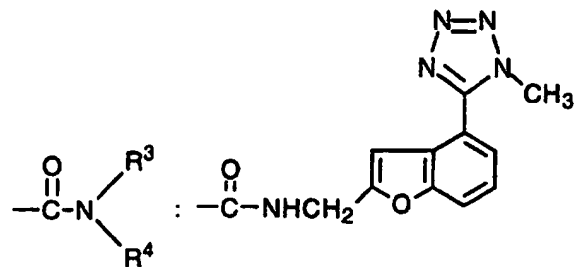
- 438 -

Example 420**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Brown plates****Solvent for recrystal.: Ethanol/dimethylformamide****M.p. (°C): 196-197****Form: Free****Example 421****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 163-165****Form: Free****Example 422****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethanol****M.p. (°C): 213-214****Form: Free**

- 439 -

Example 423

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow powder

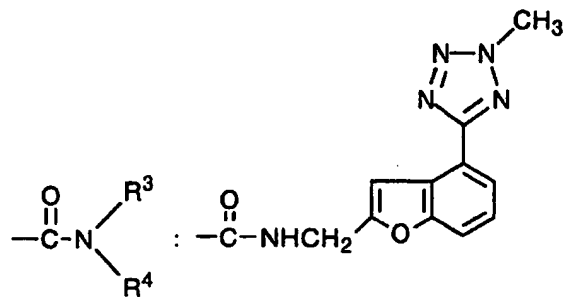
Solvent for recrystal.: Ethanol/dimethylformamide

M.p. (°C): 220-221

Form: Free

Example 424

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

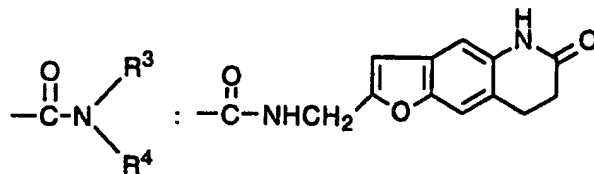
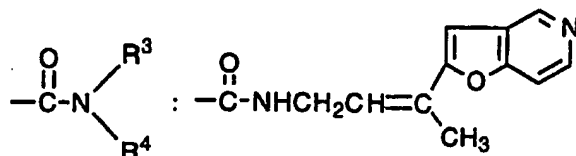
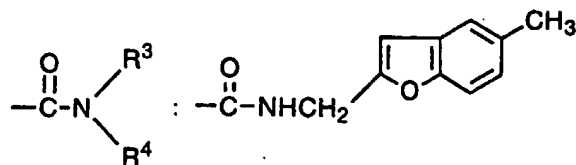
Crystalline form: Yellow powder

Solvent for recrystal.: Dimethylformamide

M.p. (°C): 214-215

Form: Free

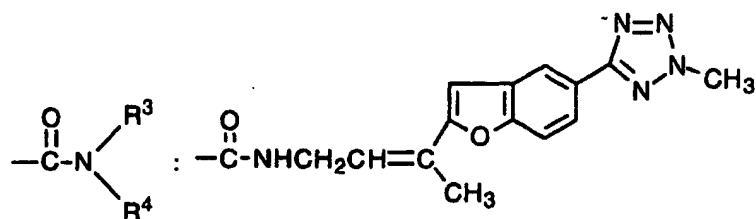
- 440 -

Example 425**Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Pale yellow powder**Solvent for recrystal.:** Dimethylformamide**M.p. (°C):** 244 (decomposed)**Form:** Free**Example 426****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Pale yellow powder**Solvent for recrystal.:** Ethyl acetate**M.p. (°C):** 186-188**Form:** Free**Example 427****Structure:****R¹:** H**R²:** CH₃**m:** 1**n:** 0**r:** 1**Crystalline form:** Pale yellow needles**Solvent for recrystal.:** Ethanol**M.p. (°C):** 174-175**Form:** Free

- 441 -

Example 428

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow powder

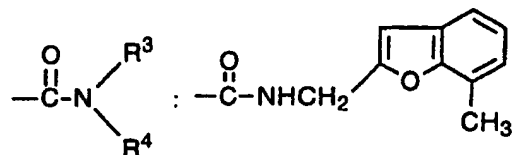
Solvent for recrystal.: Dimethylformamide

M.p. (°C): 202-203

Form: Free

Example 429

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

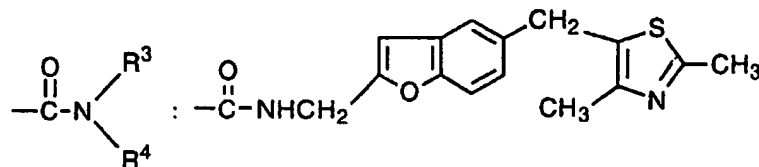
Solvent for recrystal.: Ethanol

M.p. (°C): 167-168

Form: Free

Example 430

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

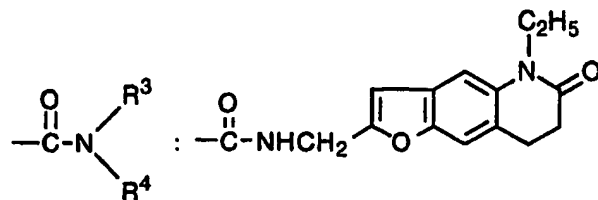
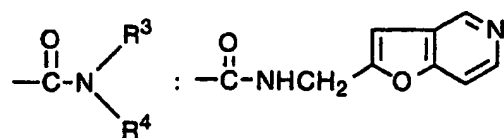
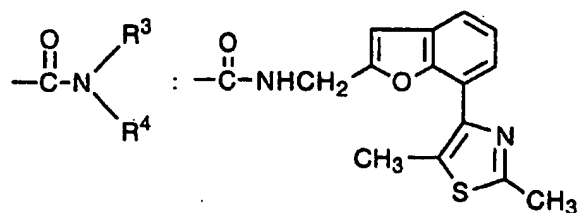
Crystalline form: White powder

Solvent for recrystal.: Ethanol

M.p. (°C): 174-175

Form: Free

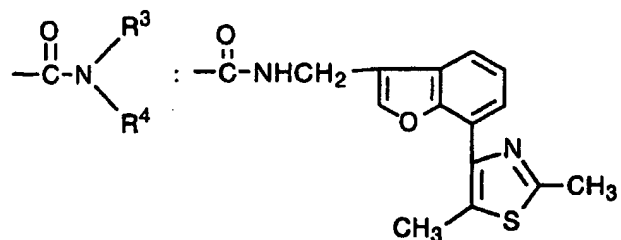
- 442 -

Example 431**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow needles****Solvent for recrystal.: Ethanol****M.p. (°C): 209-210****Form: Free****Example 432****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow powder****M.p. (°C): 198-199****Form: Free****Example 433****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow powder****Solvent for recrystal.: Dimethylformamide****M.p. (°C): 91-93****Form: Free**

- 443 -

Example 434

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

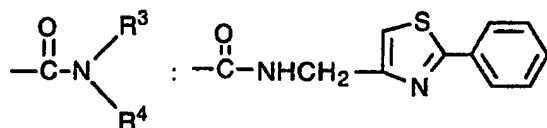
Solvent for recrystal.: Ethanol

M.p. (°C): 212-213

Form: Free

Example 435

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless prisms

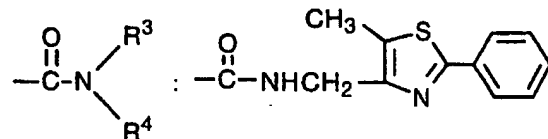
Solvent for recrystal.: Dimethylformamide

M.p. (°C): 237-238 (decomposed)

Form: Free

Example 436

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

Solvent for recrystal.: Dimethylformamide/ethanol

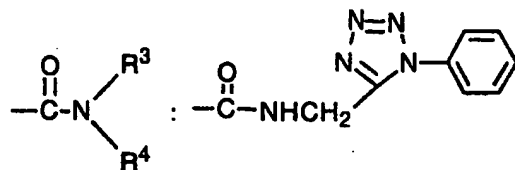
M.p. (°C): 209-209.5

Form: Free

- 444 -

Example 437

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

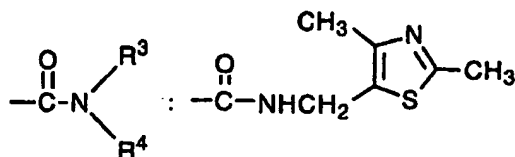
Solvent for recrystal.: Ethanol

M.p. (°C): 198.5-199

Form: Free

Example 438

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

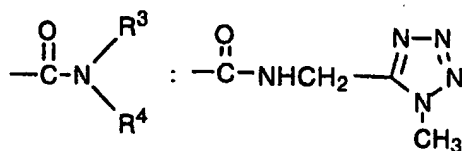
Solvent for recrystal.: Ethanol

M.p. (°C): 193.5-194

Form: Free

Example 439

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

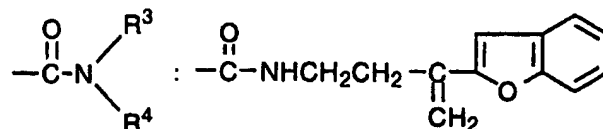
M.p. (°C): 211

Form: Free

- 445 -

Example 440

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow needles

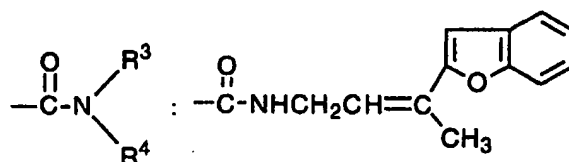
Solvent for recrystal.: Ethanol

M.p. (°C): 137-138

Form: Free

Example 441

Structure:

R¹: HR²: CH₃

m: 0

n: 0

r: 1

Crystalline form: Colorless needles

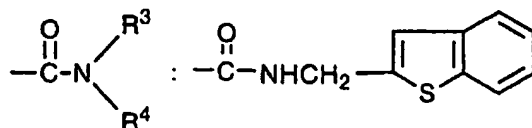
Solvent for recrystal.: Ethanol

M.p. (°C): 155.5-156

Form: Free

Example 442

Structure:

R¹: HR²: CH₃

m: 1

n: 1

r: 1

Crystalline form: Pale yellow prisms

Solvent for recrystal.: Ethanol

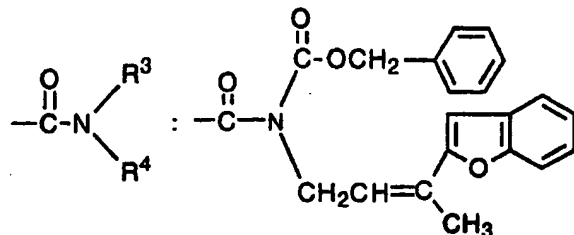
M.p. (°C): 219-220

Form: Free

- 446 -

Example 443

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow powder

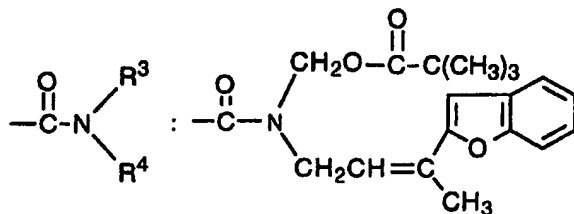
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 117-118

Form: Free

Example 444

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

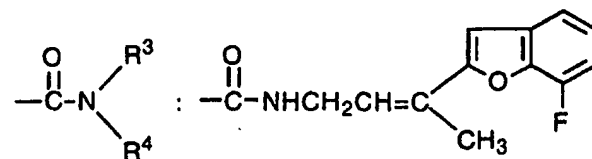
Solvent for recrystal.: Diethyl ether/n-hexane

M.p. (°C): 127-129

Form: Free

Example 445

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

Solvent for recrystal.: Acetonitrile

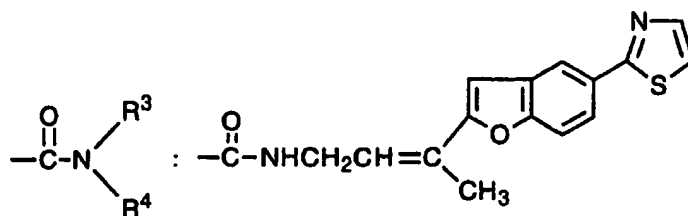
M.p. (°C): 212-213 (decomposed)

Form: Free

- 447 -

Example 446

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

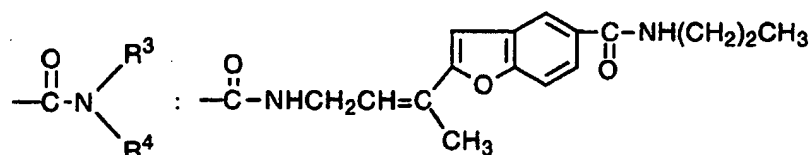
Solvent for recrystal.: Acetonitrile

M.p. (°C): 197-198

Form: Free

Example 447

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

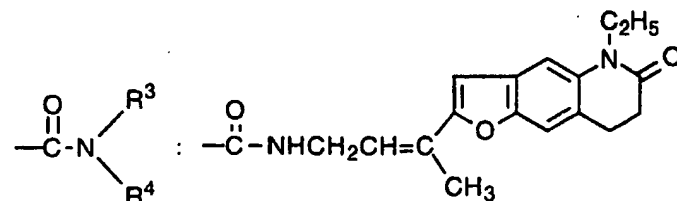
Solvent for recrystal.: Ethanol

M.p. (°C): 198-199

Form: Free

Example 448

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

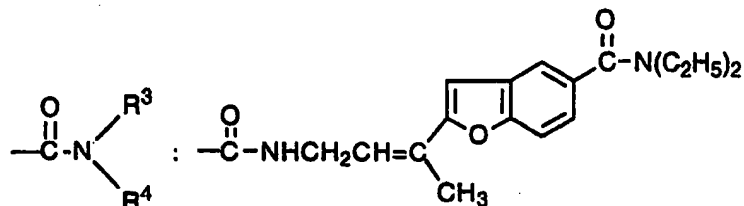
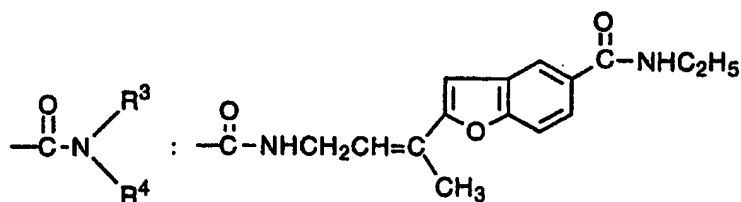
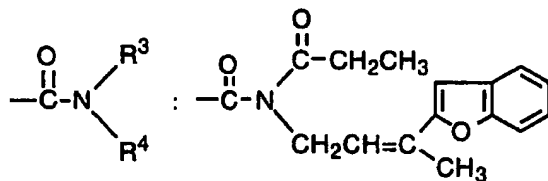
Crystalline form: Pale yellow granules

Solvent for recrystal.: Ethanol

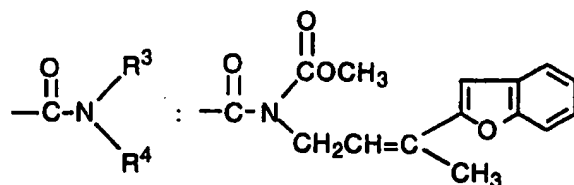
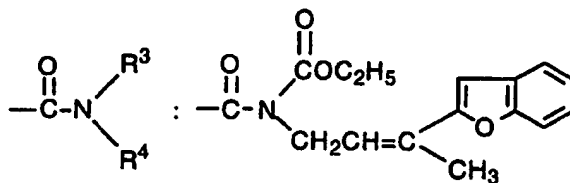
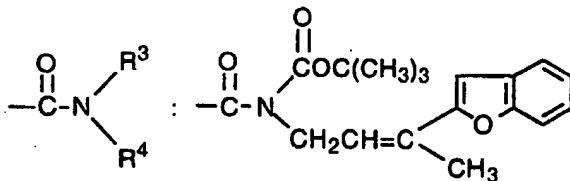
M.p. (°C): 155-156

Form: Free

- 448 -

Example 449**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow powder****Solvent for recrystal.: Diethyl ether****M.p. (°C): 100-105****Form: Free****Example 450****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless needles****Solvent for recrystal.: Ethanol****M.p. (°C): 215-216 (decomposed)****Form: Free****Example 451****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Colorless granules****Solvent for recrystal.: Diethyl ether****M.p. (°C): 103-105****Form: Free**

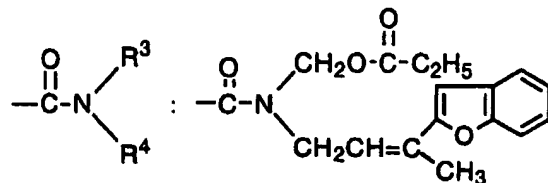
- 449 -

Example 452**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow granules****Solvent for recrystal.: Diethyl ether****M.p. (°C): 124-126****Form: Free****Example 453****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Pale yellow granules****Solvent for recrystal.: Diethyl ether****M.p. (°C): 124-125****Form: Free****Example 454****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: White powder****Solvent for recrystal.: n-Hexane/diethyl ether****M.p. (°C): 119-121****Form: Free**

- 450 -

Example 455

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow granules

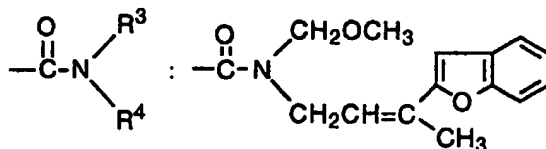
Solvent for recrystal.: Diethyl ether

M.p. (°C): 100-101

Form: Free

Example 456

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow powder

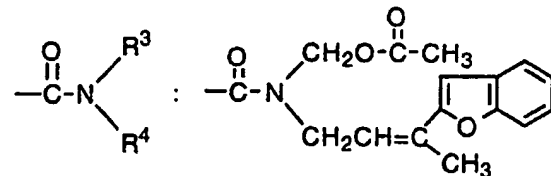
Solvent for recrystal.: Diethyl ether

M.p. (°C): 122-124

Form: Free

Example 457

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

Solvent for recrystal.: Diethyl ether

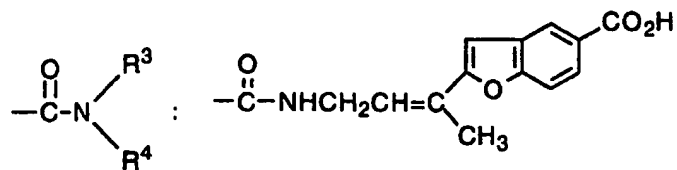
M.p. (°C): 107-109

Form: Free

- 451 -

Example 458

Structure:

R¹: HR²: CH₃

m: 1

n: 0

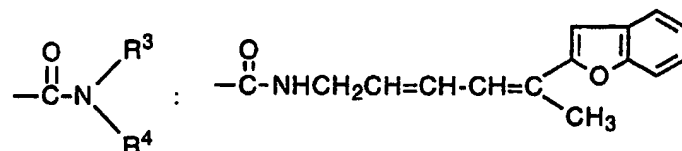
r: 1

Crystalline form: Red powder

Form: Free

Example 459

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

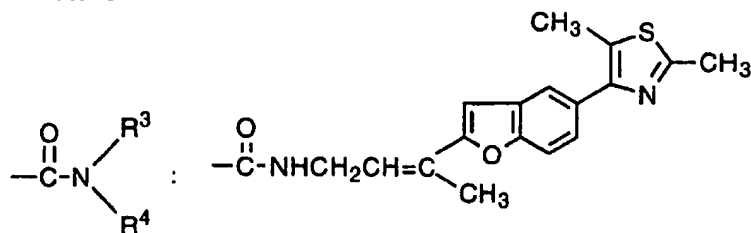
Solvent for recrystal.: Ethanol

M.p. (°C): 125-129

Form: Free

Example 460

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

Solvent for recrystal.: Ethanol

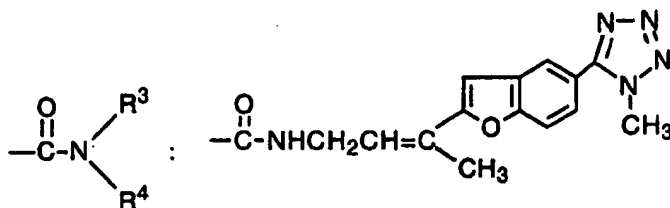
M.p. (°C): 154-157

Form: Free

- 452 -

Example 461

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

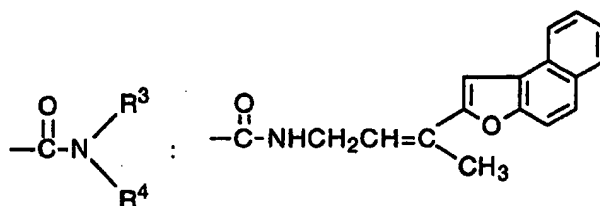
Solvent for recrystal.: Dichloromethane/ethanol

M.p. (°C): 206-208

Form: Free

Example 462

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

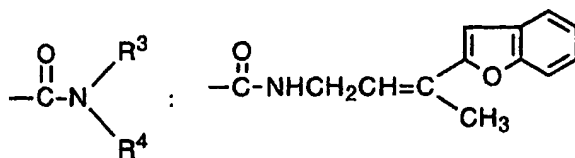
Solvent for recrystal.: Dichloromethane/ethanol

M.p. (°C): 205-208

Form: Free

Example 463

Structure:

R¹: 7-OCH₃R²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Brown granules

Solvent for recrystal.: Ethyl acetate/n-hexane

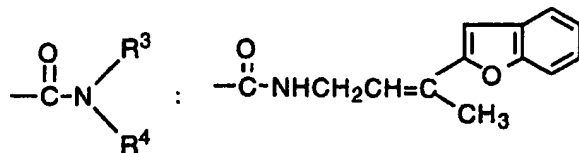
M.p. (°C): 196-197

Form: Free

- 453 -

Example 464

Structure:

R¹: 7-N(C₂H₅)₂R²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Red needles

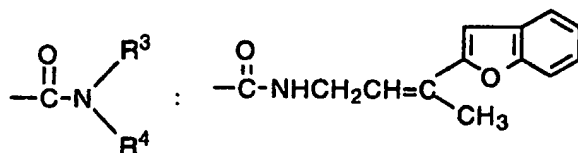
Solvent for recrystal.: Ethyl acetate

M.p. (°C): 202-204

Form: Free

Example 465

Structure:

R¹: 6-CON(C₂H₅)₂R²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

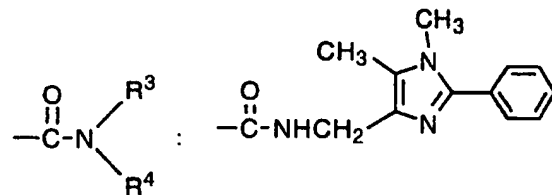
Solvent for recrystal.: Isopropanol

M.p. (°C): 160-162

Form: Free

Example 466

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

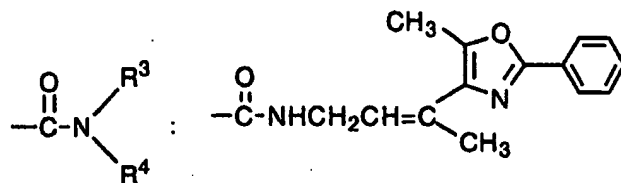
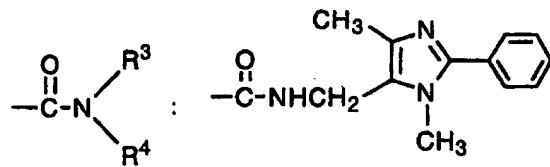
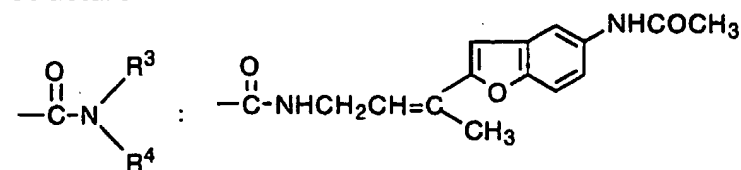
Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 172-173

Form: Free

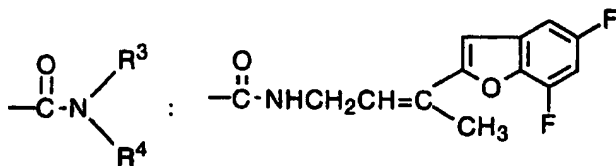
- 454 -

Example 467**Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow granules****Solvent for recrystal.: Ethanol/water****M.p. (°C): 141-142****Form: Free****Example 468****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow plates****Solvent for recrystal.: Acetone/n-hexane****M.p. (°C): 148-150****Form: Free****Example 469****Structure:****R¹: H****R²: CH₃****m: 1****n: 0****r: 1****Crystalline form: Yellow granules****Solvent for recrystal.: Acetonitrile****M.p. (°C): 221-223****Form: Free**

- 455 -

Example 470

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

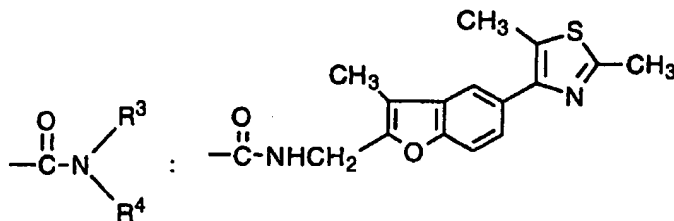
Solvent for recrystal.: Acetonitrile

M.p. (°C): 207-208

Form: Free

Example 471

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

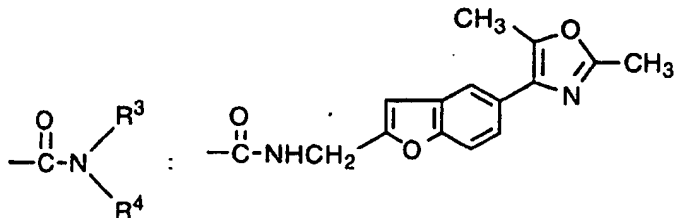
Solvent for recrystal.: Dimethylformamide/water

M.p. (°C): 205-206

Form: Free

Example 472

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

Solvent for recrystal.: Ethyl acetate/n-hexane

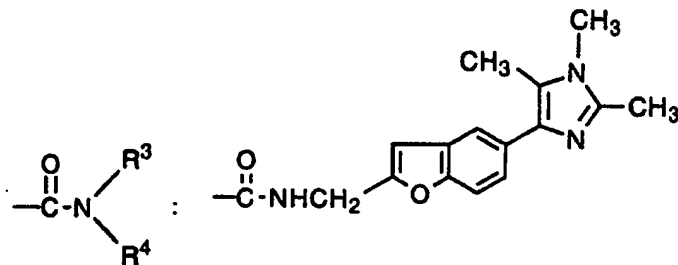
M.p. (°C): 171-172

Form: Free

- 456 -

Example 473

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow needles

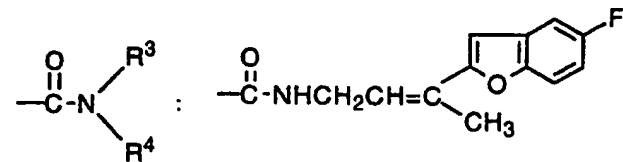
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 179-180

Form: Free

Example 474

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

Solvent for recrystal.: Acetonitrile

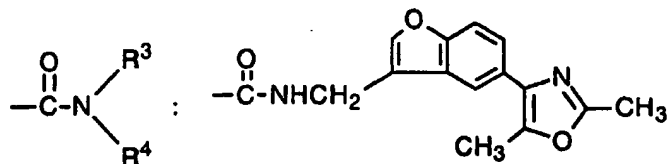
M.p. (°C): 188-189

Form: Free

- 457 -

Example 475

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

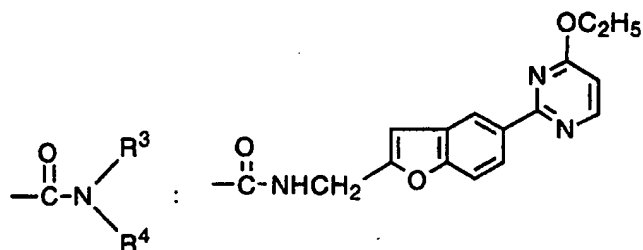
Solvent for recrystal.: Acetonitrile/water

M.p. (°C): 174-175

Form: Free

Example 476

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

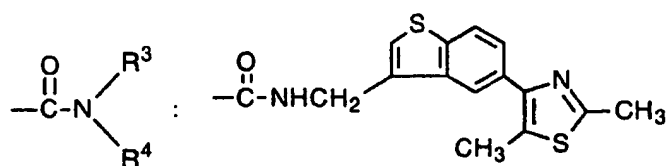
Solvent for recrystal.: Ethyl acetate/n-hexane

M.p. (°C): 187-188

Form: Free

Example 477

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Colorless needles

Solvent for recrystal.: Ethyl acetate/n-hexane

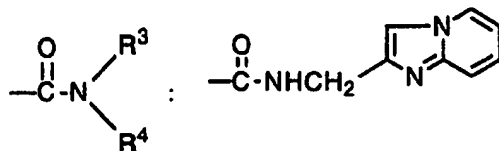
M.p. (°C): 183-184

Form: Free

- 458 -

Example 478

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow needles

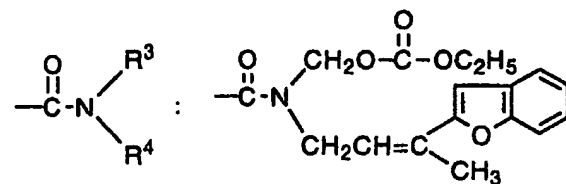
Solvent for recrystal.: Ethyl acetate/diisopropyl ether

M.p. (°C): 181-182

Form: Free

Example 479

Structure:

R¹: HR²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Pale yellow needles

Solvent for recrystal.: Diethyl ether

M.p. (°C): 109.5-110.5

Form: Free

- 459 -

NMR analysis:

Ex. No.	^1H -NMR δ ppm:
267	(CDCl_3 , 250 MHz): 2.75 (6H, s), 3.08 (3H, s), 4.78 (2H, s), 4.80 (2H, d, $J=8$ Hz), 6.67 (1H, s), 7.14 (1H, d, $J=9$ Hz), 7.15-7.20 (5H, m), 7.35 (1H, d, $J=9$ Hz), 7.45 (1H, s), 7.75-7.90 (2H, m), 8.10 (1H, m), 8.45 - 8.60 (2H, m)
305	(DMSO-d_6 , 250 MHz): 2.69 (3H, s), 4.72 (2H, d, $J=6$ Hz), 6.51 (1H, d, $J=16$ Hz), 6.88 (1H, s), 7.55-7.75 (3H, m), 7.85-8.00 (3H, m), 8.16 (1H, m), 8.50 (1H, m), 9.58 (1H, t, $J=6$ Hz)
306	(DMSO-d_6 , 250 MHz): 2.65 (3H, s), 4.69 (2H, d, $J=6$ Hz), 7.68 (1H, d, $J=9$ Hz), 7.80-8.00 (3H, m), 8.12 (1H, s), 8.15 (1H, m), 8.45 (1H, m), 8.55 (1H, s), 9.49 (1H, t, $J=6$ Hz), 12.91 (1H, br)
315	(CDCl_3 , 250 MHz): 2.17 (3H, s), 2.42 (3H, s), 3.11 (3H, s), 4.39 (2H, t, $J=7$ Hz), 6.47 (1H, t, $J=8$ Hz), 6.62 (1H, s), 7.07 (1H, d, $J=8$ Hz), 7.28 (1H, s), 7.30 (1H, d, $J=8$ Hz), 7.78-7.83 (2H, m), 8.05-8.15 (2H, m), 8.60 (1H, m)
327	(DMSO-d_6 , 250 MHz): 1.99 (3H, s), 2.69 (3H, s), 4.18 (2H, t, $J=7$ Hz), 5.94 (1H, t, $J=7$ Hz), 7.59-7.70 (3H, m), 7.83 (1H, s), 7.89-7.95 (2H, m), 8.18 (1H, m), 8.48 (1H, m), 9.17 (1H, t, $J=7$ Hz)
328	(CDCl_3 , 250 MHz): 1.29 (6H, br), 2.25 (3H, s), 3.11 (3H, s), 3.60 (4H, br), 4.34 (2H, t, $J=7$ Hz), 5.93 (1H, t, $J=7$ Hz), 7.30 (1H, s), 7.48 (2H, s), 7.68 (1H, s), 7.79-7.83 (2H, m), 8.05-8.15 (2H, m), 8.62 (1H, m)
335	(CDCl_3 , 250 MHz): 3.00 (3H, s), 3.17 (2H, t, $J=7$ Hz), 3.71 (2H, q, $J=7$ Hz), 3.85 (3H, s), 6.90 (1H, d, $J=8$ Hz), 6.92 (1H, d, $J=8$ Hz), 7.27 - 7.36 (2H, m), 7.70-7.81 (2H, m), 7.97 (1H, m), 8.27 (1H, brt, $J=7$ Hz), 8.55 (1H, m), 9.3 (1H, br)
343	(CDCl_3 , 250 MHz): 2.57 (3H, s), 3.11 (3H, s), 3.51 (3H, s), 4.85 (2H, d, $J=6$ Hz), 5.34 (2H, s), 7.17 (1H, d, $J=8$ Hz), 7.29 (1H, dd, $J=8$ Hz, 2.5 Hz), 7.78-7.82 (2H, m), 8.06 (1H, m), 8.28 (1H, br), 8.36 (1H, d, $J=2.5$ Hz), 8.60 (1H, m)

- 460 -

5

10

15

346	(CDCl ₃ , 250 MHz): 2.17 (3H, s), 3.09 (3H, s), 3.63-3.69 (8H, m), 4.31 (2H, t, J=7 Hz), 4.71 (2H, s), 5.92 (1H, t, J=7 Hz), 6.85 (1H, dd, J=8 Hz, 2 Hz), 7.02 (1H, t, J=2 Hz), 7.08 (1H, d, J=8 Hz), 7.26 (1H, t, J=8 Hz), 7.76-7.83 (2H, m), 8.05-8.12 (2H, m), 8.58 (1H, m)
347	(CDCl ₃ , 250 MHz): 1.14 (3H, t, J=7 Hz), 1.22 (3H, t, J=7 Hz), 2.17 (3H, s), 3.10 (3H, s), 3.40 (4H, q, J=7 Hz), 4.31 (2H, t, J=7 Hz), 4.69 (2H, s), 5.92 (1H, t, J=7 Hz), 6.86 (1H, d, J=8 Hz), 7.05 (1H, s), 7.06 (1H, d, J=8 Hz), 7.25 (1H, t, J=8 Hz), 7.79-7.83 (2H, m), 8.08-8.12 (2H, m), 8.60 (1H, m)
348	(CDCl ₃ , 250 MHz): 1.83 (3H, s), 2.18 (3H, s), 3.10 (3H, s), 4.31 (2H, t, J=7 Hz), 4.45 (2H, s), 4.99 (1H, s), 5.10 (1H, s), 5.93 (1H, t, J=7 Hz), 6.84 (1H, d, J=8 Hz), 7.00 (1H, s), 7.03 (1H, d, J=8 Hz), 7.24 (1H, t, J=8 Hz), 7.78-7.82 (2H, m), 8.07-8.11 (2H, m), 8.60 (1H, m)
353	(CDCl ₃ , 250 MHz): 2.18 (3H, s), 3.10 (3H, s), 3.49 (3H, s), 4.31 (2H, t, J=7 Hz), 5.19 (2H, s), 5.93 (1H, t, J=7 Hz), 6.95 (1H, d, J=8 Hz), 7.08 (1H, d, J=8 Hz), 7.10 (1H, s), 7.25 (1H, t, J=8 Hz), 7.77-7.84 (2H, m), 8.06-8.11 (2H, m), 8.60 (1H, m)
354	(CDCl ₃ , 250 MHz): 0.87 (3H, t, J=7 Hz), 1.78-2.05 (2H, m), 2.06 (3H, s), 3.10 (3H, s), 4.82 (2H, d, J=6 Hz), 5.72 (1H, t, J=8 Hz), 6.72 (1H, s), 7.26 (1H, dd, J=8 Hz, 2 Hz), 7.44 (1H, d, J=8 Hz), 7.52 (1H, d, J=2 Hz), 7.77-7.83 (2H, m), 8.08 (1H, m), 8.48 (1H, br), 8.58 (1H, m)
355	(CDCl ₃ , 250 MHz): 0.91 (3H, t, J=7 Hz), 1.82 (2H, m), 3.10 (3H, s), 4.69 (1H, br), 4.82 (2H, d, J=6 Hz), 6.71 (1H, s), 7.25 (1H, d, J=8 Hz), 7.41 (1H, d, J=8 Hz), 7.51 (1H, s), 7.78-7.82 (2H, m), 8.07 (1H, m), 8.51 (1H, br), 8.58 (1H, m)
357	(CDCl ₃ , 250 MHz): 3.09 (3H, s), 3.41 (3H, s), 4.89 (2H, d, J=7 Hz), 7.06 (1H, d, J=2 Hz), 7.14 (1H, dd, J=8 Hz, 2 Hz), 7.43 (1H, d, J=8 Hz), 7.75-7.82 (2H, m), 8.07 (1H, m), 8.53-8.59 (2H, m)
358	(CDCl ₃ , 250 MHz): 3.07 (3H, s), 3.35 (3H, s), 4.82 (2H, d, J=7 Hz), 6.68 (1H, s), 7.03 (1H, dd, J=8 Hz, 2 Hz), 7.17 (1H, d, J=2 Hz), 7.41 (1H, d, J=8 Hz), 7.74-7.82 (2H, m), 8.06 (1H, m), 8.52-8.57 (2H, m)

- 461 -

5	403	(CDCl ₃ , 250 MHz): 3.10 (3H, s), 3.73 (2H, br), 4.82 (2H, d, J=6 Hz), 6.64 (1H, d, J=7 Hz), 6.69 (1H, s), 6.9-7.1 (2H, m), 7.7-7.9 (2H, m), 8.0-8.1 (1H, m), 8.44 (1H, br), 8.5-8.6 (1H, m)
	404	(CDCl ₃ , 250 MHz): 3.11 (3H, s), 3.91 (2H, brs), 4.81 (2H, d, J=6 Hz), 6.51 (1H, d, J=8 Hz), 6.68 (1H, s), 6.93 (1H, d, J=8 Hz), 7.12 (1H, dd, J=8 Hz, 8 Hz), 7.7-7.9 (2H, m), 8.0-8.2 (1H, m), 8.48 (1H, brs), 8.5-8.7 (1H, m)
	405	(DMSO-d ₆ , 250 MHz): 2.67 (3H, s), 4.60 (2H, d, J=6 Hz), 5.14 (1H, s), 6.53 (1H, d, J=8 Hz), 6.58 (1H, s), 6.67 (1H, s), 7.21 (1H, d, J=8 Hz), 7.8-8.0 (2H, m), 8.1-8.2 (1H, m), 8.4-8.5 (1H, m), 9.40 (1H, br)
	406	(DMSO-d ₆ , 250 MHz): 2.44 (3H, s), 2.64 (3H, s), 4.50 (2H, d, J=6 Hz), 4.78 (2H, s), 6.51 (1H, d, J=8 Hz), 6.80 (1H, s), 7.12 (1H, d, J=8 Hz), 7.8-8.0 (2H, m), 8.1-8.2 (1H, m), 8.4-8.5 (1H, m), 9.21 (1H, t, J=6 Hz)
10	407	(CDCl ₃ , 250 MHz): 0.20 (3H, s), 0.22 (3H, s), 0.95 (9H, s), 2.6-2.8 (2H, m), 3.09 (3H, s), 3.1-3.3 (1H, m), 3.6-3.8 (2H, m), 5.07 (1H, d, J=6 Hz), 7.2-7.3 (4H, m), 7.7-7.9 (2H, m), 8.0-8.2 (2H, m), 8.5-8.7 (1H, m)
	408	(CDCl ₃ , 250 MHz): 2.6-2.8 (1H, br), 2.9-3.1 (2H, m), 3.06 (3H, s), 3.6 - 4.0 (3H, m), 5.15 (1H, t, J=5 Hz), 7.1-7.3 (3H, m), 7.4-7.5 (1H, m), 7.7 - 7.9 (2H, m), 8.0-8.1 (1H, m), 8.45 (1H, brs), 8.5-8.7 (1H, m)
	444	Mixture of rotamers (CDCl ₃): 1.14, 1.29 (9 H, s), 1.66, 2.20 (3H, brs), 2.62, 2.66 (3H, s), 4.28, 4.59 (2H, d, J=7.2 Hz), 5.45, 5.73 (2H, s), 6.38, 6.52 (1H, t, J=7.2 Hz), 6.57, 6.71 (1H, s), 7.15-7.35 (2H, m), 7.4-7.5 (1H, m), 7.5 - 7.6 (1H, m), 7.76-7.87 (2H, m), 8.05-8.15 (1H, m), 8.55-8.65 (1H, m)
15	455	Mixture of rotamers (CDCl ₃): 1.06, 1.19 (3H, t, J=7 Hz), 1.72, 2.19 (3H, s), 2.27, 2.47 (2H, q, J=7 Hz), 2.65, 2.66 (3H, s), 4.28, 4.59 (2H, d, J=7 Hz), 5.44, 5.73 (2H, s), 6.34, 6.49 (1H, t, J=7 Hz), 6.56, 6.71 (1H, s), 7.15-7.35 (2H, m), 7.43 (2H, d, J=8 Hz), 7.53 (1H, d, J=8 Hz), 7.70-7.85 (2H, m), 8.07 (1H, m), 8.60 (1H, m)

- 462 -

456	Mixture of rotamers (CDCl ₃): 1.70, 2.20 (3H, s), 2.66 (3H, s), 3.22, 3.55 (3H, s), 4.19, 4.58 (2H, d, J=7 Hz), 4.68, 5.12 (2H, s), 6.43, 6.51 (1H, t, J=7 Hz), 6.55, 6.70 (1H, s), 7.13-7.30 (2H, m), 7.40-7.60 (2H, m), 7.70-7.85 (2H, m), 8.10 (1H, m), 8.60 (1H, m)
457	Mixture of rotamers (CDCl ₃): 1.74, 2.20 (3H, s), 2.00, 2.17 (3H, s), 2.66, 2.67 (3H, s), 4.29, 4.59 (2H, d, J=7 Hz), 5.42, 5.71 (2H, s), 6.35, 6.49 (1H, t, J=7 Hz), 6.58, 6.71 (1H, s), 7.16-7.33 (2H, m), 7.40-7.60 (2H, m), 7.75 - 7.86 (2H, m), 8.07 (1H, m), 8.61 (1H, m)
458	(DMSO-d ₆): 2.14 (3H, s), 2.70 (3H, s), 4.23 (2H, t, J=6 Hz), 6.43 (1H, t, J=6 Hz), 7.08 (1H, s), 7.63 (1H, d, J=9 Hz), 7.80-8.00 (3H, m), 8.20 (1H, m), 8.23 (1H, s), 8.48 (1H, m), 9.26 (1H, br)
479	Mixture of rotamers (CDCl ₃): 1.23, 1.33 (3H, t, J=7.0 Hz), 1.74, 2.21 (3H, brs), 2.66, 2.67 (3H, s), 4.08, 4.25 (2H, q, J=7.0 Hz), 4.30, 4.62 (2H, d, J=7.5 Hz), 5.48, 5.75 (2H, s), 6.36, 6.49 (1H, t, J=7.5 Hz), 6.57, 6.71 (1H, s), 7.15-7.35 (2H, m), 7.4-7.6 (2H, m), 7.75-7.85 (2H, m), 8.05-8.15 (1H, m), 8.55-8.65 (1H, m)

10

Example 480

15

20

2-[[3-Methyl-3-(benzofuran-2-yl)-2-propenyl]aminocarbonyl]-3-methylquinoxalin-4-oxide (0.6 g) is dissolved in methylene chloride (40 ml), and thereto are added 4-dimethylaminopyridine (0.5 g) and di-t-butyl dicarbonate (0.6 g). The mixture is stirred at room temperature for one day.

The reaction solution is washed with diluted hydrochloric acid and brine, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; n-hexane : ethyl acetate = 3 : 1), and recrystallized from n-hexane/diethyl ether to give 2-{N-t-butoxycarbonyl-N-[3-methyl-3-(benzofuran-2-yl)-2-propenyl]aminocarbonyl}-3-methylquinoxalin-4-oxide (0.6 g) as white powder.

- 463 -

M.p. 119-121°C

Using the suitable starting compounds, there are obtained the compounds of Examples 443, 444, 451-453 in the same manner as in Example 480.

5

Example 481

2-[[3-Methyl-3-(benzofuran-2-yl)-2-propenyl]aminocarbonyl]-3-methylquinoxalin-4-oxide (1.0 g) is suspended in tetrahydrofuran (50 ml), and thereto is added sodium hydride (180 mg) under argon atmosphere. The mixture is stirred at room temperature for 40 minutes. To the mixture is added dropwise ethyl chloroformate (440 mg) under ice-cooling, and the mixture is stirred at room temperature overnight. The reaction solution is poured into ice-water, and extracted with dichloromethane. The extract is washed with water and saturated brine solution, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; methylene chloride : methanol = 400 : 1), and recrystallized from diethyl ether to give 2-{N-ethoxycarbonyl-N-[3-methyl-3-(benzofuran-2-yl)-2-propenyl]aminocarbonyl}-3-methylquinoxalin-4-oxide (0.77 g) as pale yellow granules.

10

15

M.p. 124-125°C

20

Using the suitable starting compounds, there are obtained the compounds of Examples 443, 444, 451, 452 and 454 in the same manner as in Example 481.

Example 482

2-[[3-Methyl-3-(benzofuran-2-yl)-2-propenyl]aminocarbonyl]-3-methylquinoxalin-4-oxide (1.0 g) is suspended in dimethylformamide (10 ml), and thereto is added sodium hydride (180 mg) under ice-cooling, and the mixture is stirred at room temperature for 15 minutes. To the mixture is added dropwise methoxymethyl chloride (320 mg) under ice-cooling, and the mixture is stirred at room temperature overnight. The reaction mixture is poured into ice-water, and extracted with ethyl acetate. The extract is washed with water and brine, and dried over anhydrous sodium sulfate. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography (solvent; n-hexane : ethyl acetate = 4 : 1), and recrystallized

25

30

- 464 -

from diethyl ether to give 2-[N-methoxymethyl-N-[3-methyl-3-(benzofuran-2-yl) - 2-propenyl]aminocarbonyl]-3-methylquinoxalin-4-oxide (0.23 g) in the form of a mixture of rotamers as pale yellow powder.

M.p. 122-124°C

5 $^1\text{H-NMR}$ (CDCl_3) δ ppm: 1.70, 2.20 (3H, s), 2.66 (3H, s), 3.22, 3.55 (3H, s), 4.19, 4.58 (2H, d, $J=7$ Hz), 4.68, 5.12 (2H, s), 6.43, 6.51 (1H, t, $J=7$ Hz), 6.55, 6.70 (1H, s), 7.13-7.30 (2H, m), 7.40-7.60 (2H, m), 7.70-7.85 (2H, m), 8.10 (1H, m), 8.60 (1H, m)

10 Using the suitable starting compounds, there are obtained the compounds of Examples 443, 444, 451-455, 457 and 479 in the same manner as in Example 482.

Example 483

15 To a suspension of sodium hydride (92 mg) in dimethylformamide (20 ml) is added 2-[[3-methyl-3-(benzofuran-2-yl)-2-propenyl]aminocarbonyl]-3-methylquinoxalin-4-oxide (746 mg), and the mixture is stirred at room temperature for 30 minutes. To the mixture are added chloromethyl pivalate (322 μl) and a catalytic amount of tetra-*n*-butylammonium iodide, and the mixture is stirred for one hour. The reaction mixture is poured into water, and extracted with ethyl acetate. The extract is washed with water and brine, and dried. The resultant is evaporated to remove the solvent, and the residue is purified by silica gel column chromatography, and recrystallized from diethyl ether/*n*-hexane to give 2-[N-pivaloyloxymethyl-N-[3-methyl-3-(benzofuran-2-yl) - 2-propenyl]aminocarbonyl]-3-methylquinoxalin-4-oxide (300 mg) in the form of a mixture of rotamers as pale yellow needles.

25 M.p. 127-129°C

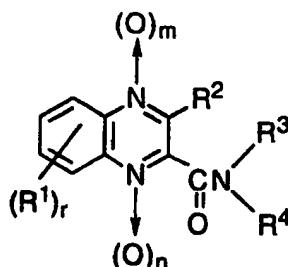
$^1\text{H-NMR}$ (CDCl_3) δ ppm: 1.14, 1.29 (9H, s), 1.66, 2.20 (3H, brs), 2.62, 2.66 (3H, s), 4.28, 4.59 (2H, d, $J=7.2$ Hz), 5.45, 5.73 (2H, s), 6.38, 6.52 (1H, t, $J=7.2$ Hz), 6.57, 6.71 (1H, s), 7.15-7.35 (2H, m), 7.4-7.5 (1H, m), 7.5-7.6 (1H, m), 7.76-7.87 (2H, m), 8.05-8.15 (1H, m), 8.55-8.65 (1H, m)

30 Using the suitable starting compounds, there are obtained the compounds of Examples 443, 451-457 and 479 in the same manner as in Example 483.

- 465 -

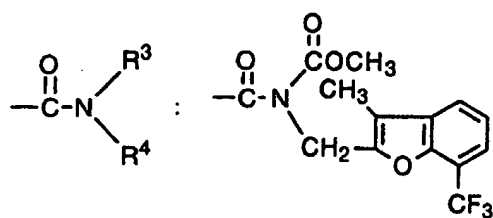
Using the suitable starting compounds, there are obtained the compounds as listed in Table 7 in the same manner as in Examples 1 to 4.

Table 7



Example 484

Structure:



R¹: H

R²: CH₃

m: 1

n: 0

r: 1

Crystalline form: White powder

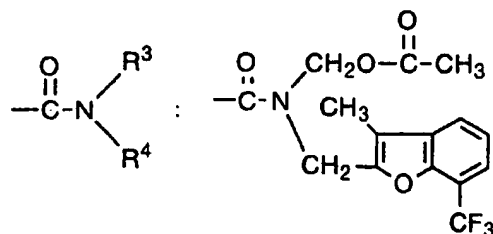
Solvent for recrystal.: Diethyl ether

M.p. (°C): 129-134

Form: Free

Example 485

Structure:



R¹: H

R²: CH₃

m: 1

n: 0

r: 1

Crystalline form: Yellow granules

Solvent for recrystal.: Diethyl ether

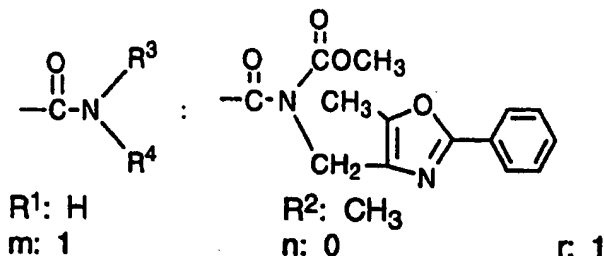
M.p. (°C): 126-127

Form: Free

- 466 -

Example 486

Structure:



Crystalline form: Pale yellow granules

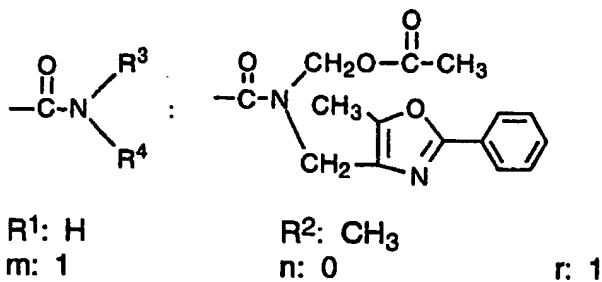
Solvent for recrystal.: Diethyl ether

M.p. (°C): 170-172

Form: Free

Example 487

Structure:



Crystalline form: Colorless granules

Solvent for recrystal.: Ethanol

M.p. (°C): 140-141

Form: Free

Ex. No.	$^1\text{H-NMR } \delta \text{ ppm:}$
485	Mixture of rotamers (CDCl_3): 1.86, 1.87 (3H, s), 2.06, 2.40 (3H, s), 2.50, 2.61 (3H, s), 4.91, 5.08 (2H, s), 5.48, 5.71 (2H, s), 7.26-7.40 (1H, m), 7.50-7.60 (1H, m), 7.65-7.75 (1H, m), 7.75-7.86 (2H, m), 7.98-8.15 (1H, m), 8.55-8.65 (1H, m)
487	Mixture of rotamers (CDCl_3): 1.98, 2.11 (3H, s), 2.15, 2.53 (3H, s), 2.64, 2.69 (3H, s), 4.60, 4.80 (2H, s), 5.55, 5.72 (2H, s), 7.40-7.50 (3H, m), 7.70-7.80 (2H, m), 7.85-8.10 (3H, m), 8.55-8.65 (1H, m)

- 467 -

Pharmacological Experiment

Experiment: Test of glucose-uptake by L6 cells

L6 cells (derived from rat striated muscle) were pre-cultured in minimum essential medium (MEM) containing 10 % FCS and put onto a 48 -
5 well plate by each 4×10^4 cells/well. The plate was cultured in 2 % FCS so that L6 cells were differentiated into muscle cells. Six days later, a test compound was added to the culture mixture, and the culture solution was removed the following day, and further thereto was added [^3H]-2-deoxyglucose, and the
10 plate was reacted at 37°C for 10 minutes. After the reaction is complete, the plate was washed twice with cold phosphate buffer saline solution, and the cells were subjected to hydrolysis with 0.1 % sodium docecylsulfate, and the radioactivity of the resultant was measured. The glucose-uptake was estimated by comparing the radioactivity of the well with a test compound with the
15 radioactivity of the well without a test compound (control) and expressed by percentage (%). The results are shown in Table 8.

- 468 -

Table 8

5	Test Comp.	Dose (mole)	Glucose - uptake (%)	Test Comp.	Dose (mole)	Glucose - uptake (%)
	Ex. 29	10 ⁻⁵	201	Ex. 30	10 ⁻⁵	210
	Ex. 33	10 ⁻⁵	120	Ex. 39	10 ⁻⁵	159
10	Ex. 41	10 ⁻⁵	181	Ex. 44	10 ⁻⁵	176
	Ex. 45	10 ⁻⁶	147	Ex. 46	10 ⁻⁶	217
	Ex. 47	10 ⁻⁵	148	Ex. 60	10 ⁻⁶	166
	Ex. 61	10 ⁻⁶	154	Ex. 62	10 ⁻⁶	223
	Ex. 66	10 ⁻⁵	154	Ex. 69	10 ⁻⁶	194
	Ex. 73	10 ⁻⁶	168	Ex. 75	10 ⁻⁶	249
15	Ex. 77	10 ⁻⁶	245	Ex. 83	10 ⁻⁵	153
	Ex. 85	10 ⁻⁶	177	Ex. 92	10 ⁻⁶	201
	Ex. 93	10 ⁻⁶	240	Ex. 94	10 ⁻⁶	188
	Ex. 96	10 ⁻⁶	200	Ex. 97	10 ⁻⁶	136
	Ex. 99	10 ⁻⁶	154	Ex. 103	10 ⁻⁵	198
	Ex. 105	10 ⁻⁵	186	Ex. 107	10 ⁻⁶	206
20	Ex. 109	10 ⁻⁵	222	Ex. 110	10 ⁻⁵	209
	Ex. 112	10 ⁻⁵	159	Ex. 113	10 ⁻⁵	123
	Ex. 117	10 ⁻⁵	226	Ex. 119	10 ⁻⁵	158
	Ex. 122	10 ⁻⁵	199	Ex. 125	10 ⁻⁵	188
	Ex. 126	10 ⁻⁵	212	Ex. 130	10 ⁻⁵	161
	Ex. 132	10 ⁻⁶	187	Ex. 134	10 ⁻⁵	125
25	Ex. 136	10 ⁻⁵	129	Ex. 143	10 ⁻⁵	210
	Ex. 145	10 ⁻⁵	136	Ex. 147	10 ⁻⁵	138
	Ex. 150	10 ⁻⁶	203	Ex. 151	10 ⁻⁶	156
	Ex. 148	10 ⁻⁶	183	Ex. 153	10 ⁻⁵	191
	Ex. 154	10 ⁻⁵	163	Ex. 155	10 ⁻⁵	212
	Ex. 156	10 ⁻⁶	155	Ex. 159	10 ⁻⁵	152

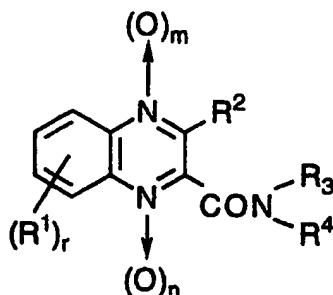
- 469 -

5	Ex. 162	10^{-5}	187	Ex. 166	10^{-5}	168
	Ex. 170	10^{-6}	165	Ex. 171	10^{-5}	163
	Ex. 175	10^{-5}	123	Ex. 177	10^{-6}	178
	Ex. 179	10^{-6}	200	Ex. 181	10^{-6}	223
	Ex. 182	10^{-5}	150	Ex. 183	10^{-5}	212
10	Ex. 185	10^{-6}	169	Ex. 190	10^{-6}	193
	Ex. 193	10^{-6}	121	Ex. 199	10^{-6}	165
	Ex. 200	10^{-6}	142	Ex. 201	10^{-6}	207
	Ex. 203	10^{-6}	239	Ex. 204	10^{-6}	192
	Ex. 208	10^{-5}	125	Ex. 210	10^{-5}	145
15	Ex. 212	10^{-5}	121	Ex. 213	10^{-5}	146
	Ex. 215	10^{-5}	186	Ex. 221	10^{-6}	120
	Ex. 224	10^{-5}	135	Ex. 229	10^{-5}	149
	Ex. 238	10^{-5}	144	Ex. 383	10^{-6}	168
	Ex. 428	10^{-6}	128	Ex. 446	10^{-6}	183
	Ex. 459	10^{-6}	127	Ex. 460	10^{-6}	158
	Ex. 470	10^{-6}	204			

- 470 -

CLAIMS

1. A quinoxaline derivative of the formula:



wherein R¹ is hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent,

R² is hydrogen atom, a lower alkyl group having optionally a halogen substituent, phenyl group, a morpholino-substituted lower alkyl group or an imidazolyl-substituted lower alkyl group,

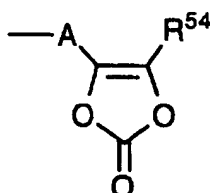
n is 0,

m is 0 or 1,

r is 1 or 2,

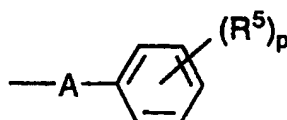
R³ and R⁴ are the same or different and each a) hydrogen atom; b) a lower alkyl group; c) a phenyl-lower alkoxy carbonyl group; d) a lower alkanoyloxy-substituted lower alkyl group; e) a lower alkanoyl group; f) a lower alkoxy carbonyl group; g) a lower alkoxy-lower alkyl group; h) a phenoxy - carbonyl group; i) a lower alkanoyl-substituted lower alkyl group; j) a lower alkoxy carbonyloxy-substituted lower alkyl group; k) a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; l) a group of the formula: -E-N(R⁵²)(R⁵³) (in which R⁵² and R⁵³ are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxy carbonyl group or phenyl group, or R⁵² and R⁵³ may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: -CO-, or a group of the formula: -CO-A- (in which A is a lower alkylene group)); m) a group of the formula:

- 471 -



5

(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above); n) a group of the formula:



10

(in which A is the same as defined above, p is an integer of 1 to 3, R⁵ is a lower alkoxy-substituted lower alkoxy group, a lower alkoxy group, an amino group having optionally a lower alkyl substituent, a halogen atom, nitro group, hydroxy group, a lower alkyl group having optionally a hydroxy substituent, a lower alkenyloxy group, a carboxyl-substituted lower alkoxy group, a lower alkoxy-carbonyl-substituted lower alkoxy group, a lower alkoxy-carbonyl group, a halogen-substituted lower alkoxy group, a hydroxy-substituted lower alkoxy group, a phenyl-lower alkoxy group having optionally a substituent selected from a lower alkyl group and a lower alkoxy group on the phenyl moiety, a 1,3-dioxolanyl group having optionally a lower alkyl substituent, a lower alkanoyl group, a morpholino-substituted lower alkoxy group, a morpholino-substituted lower alkyl group, a morpholinocarbonyl group or a group of the formula: -Y-A₁-CONR⁶R⁷ (in which A₁ is a lower alkylene group, Y is a group of the formula: -O- or a group of the formula: -NH-, R⁶ and R⁷ are the same or different and each hydrogen atom, a lower alkyl group having optionally a hydroxy substituent, a phenyl-lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, a furyl-substituted lower alkyl group, or a lower alkoxy-substituted lower alkyl group, or R⁶ and R⁷ may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with nitrogen atom or oxygen atom, said heterocyclic group having optionally 1 to 3 substituents selected from hydroxy group, a lower alkyl group and a phenyl-lower alkyl group)); o) a phenyl-lower alkenyl group having optionally a

25

20

15

30

- 472 -

substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the

5 tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 is a lower alkylene group, R^{40} and R^{41} are the same or different and each hydrogen atom or a lower alkyl group, or R^{40} and R^{41} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6 -

10 membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; p) an alkenyl group; q) a cycloalkyl-lower alkyl group; r) a naphthyl -

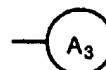
15 lower alkyl group; s) a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; t) a phenylsulfinyl -

substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; u) a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; v) a phenoxy -

substituted lower alkyl group; w) a group of the formula:



(in which q is an integer of 1 to 3, a group of the formula:



is a lower alkyl group substituted by a 5- to 14-membered saturated or unsaturated heteromonocyclic, heterobicyclic or heterotricyclic group having 1

25 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R^8 substitutes on the above heterocyclic group, and is hydrogen atom, oxo group, a lower alkyl group having optionally a hydroxy substituent, a halogen atom, nitro group, a lower alkoxy group, cyano group, a lower alkoxycarbonyl group, a phenyl-lower alkoxy group having optionally an amino group having

30 optionally a lower alkanoyl substituent on the phenyl moiety, a carboxyl - substituted lower alkoxy group, carboxyl group, a lower alkoxycarbonyl-

- 473 -

substituted lower alkoxy group, hydroxy group, a lower alkoxy-substituted lower alkoxy group, a lower alkenyloxy group, a lower alkanoyloxy-substituted lower alkyl group, a halogen-substituted lower alkyl group, a lower alkanoyl group, a phenyl group having optionally a substituent selected from a lower alkyl group, a lower alkoxy-substituted lower alkoxy group, hydroxy group, a halogen atom and a lower alkoxy group on the phenyl moiety, a lower alkenyl group, a morpholinocarbonyl-lower alkoxy group, a lower alkylsulfinyl group, an amino-substituted lower alkyl group having optionally a substituent selected from a lower alkylsulfonyl group and a lower alkanoyl group, a lower alkylthio group, a lower alkylsulfonyl group, a lower alkanoyloxy group, a 1,3-dioxolanyl-substituted lower alkyl group having optionally a lower alkyl substituent, a lower alkanoyl-substituted lower alkyl group, an aminocarbonyl-substituted lower alkyl group having optionally a lower alkyl substituent, a lower alkoxycarbonyl-substituted lower alkenyl group, an aminocarbonyl-substituted lower alkenyl group having optionally a lower alkyl substituent, a carboxyl-substituted lower alkenyl group, benzoyl group, a lower alkoxy-lower alkyl group, a group of the formula:



(in which s is an integer of 1 to 3, a group of the formula: is a 5- to 6-membered saturated or unsaturated heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R⁴⁵ bonds to said heterocyclic group and is hydrogen atom, a lower alkyl group, a lower alkoxy-substituted lower alkyl group, phenyl group or oxo group), a group of the formula:



30 (in which t is an integer of 1 to 3, a group of the formula: is a lower

- 474 -

alkyl group substituted by a 5- to 6-membered saturated or unsaturated heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R⁴⁶ bonds to said heterocyclic group and is hydrogen atom, a lower alkyl group or oxo group), or a group of the formula:

5 $-(C=O)_lNR^9R^{10}$ (in which l is 0 or 1, R⁹ and R¹⁰ are the same or different and each hydrogen atom, a lower alkanoyl group, a lower alkyl group, a morpholinocarbonyl-lower alkyl group, a cycloalkylcarbonyl group, a phenyl - lower alkenylcarbonyl group, a lower alkylsulfonyl group, an aminocarbonyl group having optionally a lower alkyl substituent, a phenylsulfonyl group

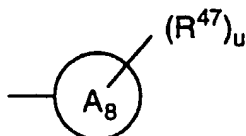
10 having optionally a lower alkyl substituent on the phenyl moiety, a phenyl-lower alkenyl group, a benzoyl group having optionally 1 to 3 substituents selected from a halogen atom, a lower alkoxy group, an amino group having optionally a lower alkanoyl substituent and hydroxy group on the phenyl moiety, an amino - substituted lower alkanoyl group having optionally a lower alkanoyl substituent,

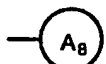
15 an amino-substituted sulfonyl group having optionally a lower alkyl substituent, a phenyl-lower alkyl group, phenyl group, or an amino group having optionally a lower alkanoyl substituent, or R⁹ and R¹⁰ may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another

20 nitrogen atom or oxygen atom)); x) a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A₅ is a lower alkylene group, R⁴² and R⁴³ combine together to form a group of the formula: =O, or =N-OH or a lower alkylendioxy group, and R⁴⁴ is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); y) a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having

25 optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring; or z) a group of the formula:

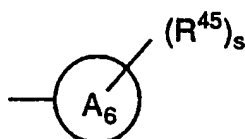
30

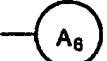


(in which u is an integer of 1 to 3, a group of the formula:  is a lower

- 475 -

alkenyl group substituted by a 5- to 14-membered saturated or unsaturated, heteromonocyclic, heterobicyclic or heterotricyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R⁴⁷ bonds on said heterocyclic group and is hydrogen atom, a halogen-substituted lower alkyl group, oxo group, a halogen atom, a lower alkoxy group, a lower alkyl group, a lower alkoxy carbonyl group, carboxyl group, an aminocarbonyl group having optionally a lower alkyl substituent, an amino group having optionally a lower alkanoyl substituent, a phenyl group having optionally a substituent selected from a lower alkoxy group and a halogen atom on the phenyl moiety, or a group of the formula:



(in which , R⁴⁵ and s are the same as defined above)),

or R³ and R⁴ may combine together with the adjacent nitrogen atom to which they bond to form 1,2,3,4-tetrahydroisoquinolyl group, said heterocyclic group having optionally a lower alkoxy substituent,

provided that when R¹ is hydrogen atom, R² is methyl group, R³ is hydrogen atom, and m is 0, then R⁴ is not 2-(imidazol-2-yl)ethyl, 2-(indol-3-yl)ethyl, or sec-butyl, or a salt thereof.

2. A quinoxaline derivative according to claim 1, wherein m is 1, or a salt thereof.

3. A quinoxaline derivative according to claim 1, wherein m is 0, or a salt thereof.

4. A quinoxaline derivative according to claim 1, wherein R¹ is hydrogen atom, or a salt thereof.

5. A quinoxaline derivative according to claim 1, wherein R¹ is a halogen atom, a lower alkyl group, a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent, or a salt thereof.

- 476 -

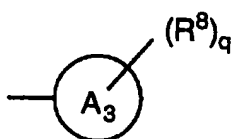
6. A quinoxaline derivative according to claim 4, wherein R^2 is a lower alkyl group having optionally a halogen substituent, or a salt thereof.

7. A quinoxaline derivative according to claim 4, wherein R^2 is hydrogen atom, phenyl group, a morpholino-substituted lower alkyl group or an imidazolyl-substituted lower alkyl group, or a salt thereof.

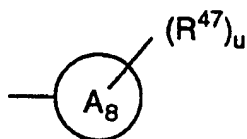
8. A quinoxaline derivative according to claim 5, wherein R^2 is a lower alkyl group having optionally a halogen substituent, or a salt thereof.

9. A quinoxaline derivative according to claim 5, wherein R^2 is hydrogen atom, phenyl group, a morpholino-substituted lower alkyl group or an imidazolyl-substituted lower alkyl group, or a salt thereof.

10. A quinoxaline derivative according to claim 6, wherein R^3 is hydrogen atom, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, or a lower alkoxycarbonyloxy-substituted lower alkyl group; and R^4 is a group of the formula:



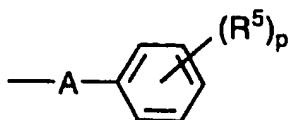
(wherein the group $\text{---} \bigcirc A_3 \text{---}$, R^8 and q are as defined in claim 1), or a group of the formula:



(wherein the group $\text{---} \bigcirc A_8 \text{---}$, R^{47} and u are as defined in claim 1), or a salt thereof.

11. A quinoxaline derivative according to claim 6, wherein R^3 is hydrogen atom, a lower alkyl group, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxycarbonyl group, or a lower alkoxycarbonyloxy-substituted lower alkyl group; and R^4 is a group of the formula:

- 477 -



- (in which A, R^5 and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula:
- 5 -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄ is a lower alkylene group, R⁴⁰ and R⁴¹ are the same or different and each hydrogen atom or a lower alkyl group, or R⁴⁰ and R⁴¹ may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy
- 10 group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; an alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy
- 15 substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅ is a lower alkylene group, R⁴² and R⁴³ combine together to form a group of the formula: =O, or =N-OH or a lower alkylenedioxy group, and R⁴⁴ is a phenyl
- 20 group having optionally a lower alkoxy substituent on the phenyl moiety); a 2,3 - dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, or a salt thereof.
- 25 12. A quinoxaline derivative according to claim 6, wherein R³ is a phenyl-lower alkoxy carbonyl group; a lower alkanoyl group; a lower alkoxy - lower alkyl group; a phenoxy carbonyl group; a lower alkanoyl-substituted lower alkyl group; a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; a group of the formula: -E-N(R⁵²)(R⁵³)
- 30

- 478 -

(in which R^{52} and R^{53} are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxy carbonyl group or phenyl group, or R^{52} and R^{53} may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being
 5 intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: $-\text{CO}-$, or a group of the formula: $-\text{CO}-\text{A}-$ (in which A is a lower alkylene group)); or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above), and R^4 is a group of the formula:

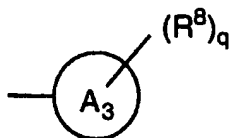


(in which A, R^5 and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower
 20 alkanoyl group and a phenyl-lower alkenyl carbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-\text{O}-\text{A}_4-\text{CO}-\text{NR}^{40}\text{R}^{41}$ (in which A_4 is a lower alkylene group, R^{40} and R^{41} are the same or different and each hydrogen atom or a lower alkyl group, or R^{40} and
 25 R^{41} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen
 30 substituent on the phenyl moiety; alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl - substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having


- 479 -

optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula:

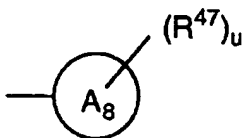
5

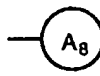


10

(in which the group , R⁸ and q are as defined in claim 1); a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅ is a lower alkylene group, R⁴² and R⁴³ combine together to form a group of the formula: =O, or =N-OH or a lower alkylenedioxy group, and R⁴⁴ is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3 - dihydro-1H-indenyl ring; or a group of the formula:

15



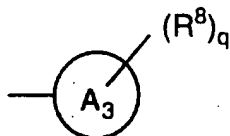
(in which the group , R⁴⁷ and u are as defined in claim 1), or a salt thereof.

20

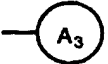
13. A quinoxaline derivative according to claim 6, wherein R³ and R⁴ combine together with the adjacent nitrogen atom to which they bond to form 1,2,3,4-tetrahydroisoquinolyl group, said heterocyclic group having optionally a lower alkoxy substituent, or a salt thereof.

25

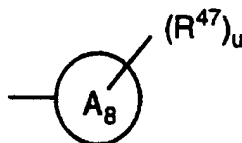
14. A quinoxaline derivative according to claim 7, wherein R³ is hydrogen atom, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, or a lower alkoxy carbonyloxy-substituted lower alkyl group; and R⁴ is a group of the formula:

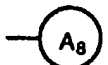


- 480 -

(wherein the group , R^8 and q are as defined in claim 1), or a group of the formula:

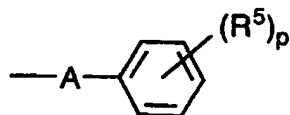
5



(wherein the group , R^{47} and u are as defined in claim 1), or a salt thereof.

15. A quinoxaline derivative according to claim 7, wherein R^3 is hydrogen atom, a lower alkyl group, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, or a lower alkoxy carbonyloxy-substituted lower alkyl group; and R^4 is a group of the formula:

10



15 (in which A , R^5 and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy -

20 substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 is a lower alkylene group, R^{40} and R^{41} are the same or different and each hydrogen atom or a lower alkyl group, or R^{40} and R^{41} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being

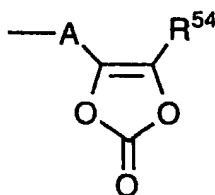
25 intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; an alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a

30 phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy

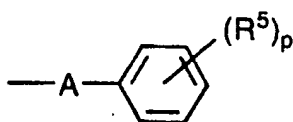
- 481 -

substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 is a lower alkylene group, R^{42} and R^{43} combine together to form a group of the formula: $=O$, or $=N-OH$ or a lower alkylenedioxy group, and R^{44} is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); or a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, or a salt thereof.

16. A quinoxaline derivative according to claim 7, wherein R^3 is a phenyl-lower alkoxy carbonyl group; a lower alkanoyl group; a lower alkoxy - lower alkyl group; a phenoxycarbonyl group; a lower alkanoyl-substituted lower alkyl group; a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; a group of the formula: $-E-N(R^{52})(R^{53})$ (in which R^{52} and R^{53} are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxy carbonyl group or phenyl group, or R^{52} and R^{53} may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: $-CO-$, or a group of the formula: $-CO-A-$ (in which A is a lower alkylene group)); or a group of the formula:



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above), and R^4 is a group of the formula:



(in which A , R^5 and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen

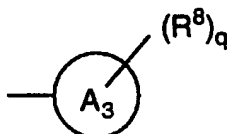
- 482 -

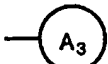
atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula:

5 -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄ is a lower alkylene group, R⁴⁰ and R⁴¹ are the same or different and each hydrogen atom or a lower alkyl group, or R⁴⁰ and R⁴¹ may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy

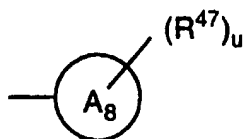
10 group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl - substituted lower alkyl group having optionally a lower alkoxy substituent on

15 the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula:



(in which the group , R⁸ and q are as defined in claim 1); a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅ is a lower alkylene group, R⁴² and R⁴³ combine together to form a group of the formula: =O, or =N-OH or a lower alkylenedioxy group, and R⁴⁴ is a phenyl group having optionally a lower

25 alkoxy substituent on the phenyl moiety); a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3 - dihydro-1H-indenyl ring; or a group of the formula:

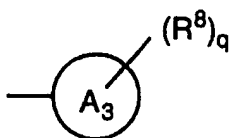


- 483 -

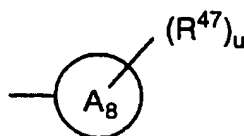
(in which the group $\text{---}\text{A}_8$, R^{47} and u are as defined in claim 1), or a salt thereof.

17. A quinoxaline derivative according to claim 7, wherein R^3 and R^4 combine together with the adjacent nitrogen atom to which they bond to form 1,2,3,4-tetrahydroisoquinolyl group, said heterocyclic group having optionally a lower alkoxy substituent, or a salt thereof.

18. A quinoxaline derivative according to claim 8, wherein R^3 is hydrogen atom, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, or a lower alkoxy carbonyloxy-substituted lower alkyl group; and R^4 is a group of the formula:

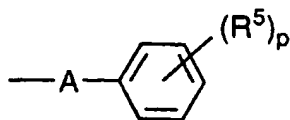


(wherein the group $\text{---}\text{A}_3$, R^8 and q are as defined in claim 1), or a group of the formula:



(wherein the group $\text{---}\text{A}_8$, R^{47} and u are as defined in claim 1), or a salt thereof.

19. A quinoxaline derivative according to claim 8, wherein R^3 is hydrogen atom, a lower alkyl group, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, or a lower alkoxy carbonyloxy-substituted lower alkyl group; and R^4 is a group of the formula:



(in which A , R^5 and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen

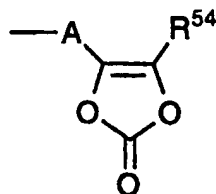
- 484 -

- atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula:
- 5 -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄ is a lower alkylene group, R⁴⁰ and R⁴¹ are the same or different and each hydrogen atom or a lower alkyl group, or R⁴⁰ and R⁴¹ may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy
- 10 group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; an alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy
- 15 substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅ is a lower alkylene group, R⁴² and R⁴³ combine together to form a group of the formula: =O, or =N-OH or a lower alkylenedioxy group, and R⁴⁴ is
- 20 a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); or a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, or a salt thereof.
- 25 20. A quinoxaline derivative according to claim 8, wherein R³ is a phenyl-lower alkoxycarbonyl group; a lower alkanoyl group; a lower alkoxy - lower alkyl group; a phenoxycarbonyl group; a lower alkanoyl-substituted lower alkyl group; a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; a group of the formula: -E-N(R⁵²)(R⁵³)
- 30 (in which R⁵² and R⁵³ are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxycarbonyl group or phenyl group, or R⁵² and R⁵³ may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being

- 485 -

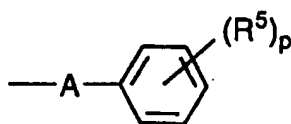
intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: $-\text{CO}-$, or a group of the formula: $-\text{CO}-\text{A}-$ (in which A is a lower alkylene group)); or a group of the formula:

5



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above), and R^4 is a group of the formula:

10



15

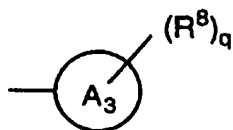
(in which A, R^5 and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-\text{O}-\text{A}_4-\text{CO}-\text{NR}^{40}\text{R}^{41}$ (in which A_4 is a lower alkylene group, R^{40} and R^{41} are the same or different and each hydrogen atom or a lower alkyl group, or R^{40} and R^{41} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl - substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula:

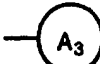
20

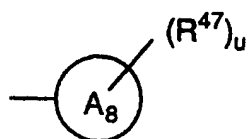
25

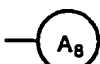
30

- 486 -



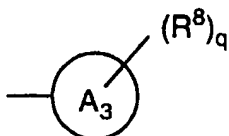
- (in which the group , R^8 and q are as defined in claim 1); a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 is a lower alkylene group, R^{42} and R^{43} combine together to form a group of the formula: $=O$, or $=N-OH$ or a lower alkylenedioxy group, and R^{44} is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring; or a group of the formula:




- (in which the group , R^{47} and u are as defined in claim 1), or a salt thereof.

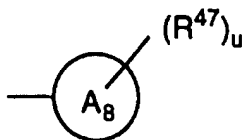
21. A quinoxaline derivative according to claim 8, wherein R^3 and R^4 combine together with the adjacent nitrogen atom to which they bond to form 1,2,3,4-tetrahydroisoquinolyl group, said heterocyclic group having optionally a lower alkoxy substituent, or a salt thereof.

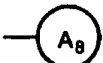
22. A quinoxaline derivative according to claim 9, wherein R^3 is hydrogen atom, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, or a lower alkoxy carbonyloxy-substituted lower alkyl group; and R^4 is a group of the formula:



- (wherein the group , R^8 and q are as defined in claim 1), or a group of the formula:

- 487 -

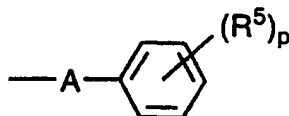


(wherein the group , R^{47} and u are as defined in claim 1), or a salt

5 thereof.

23. A quinoxaline derivative according to claim 9, wherein R^3 is hydrogen atom, a lower alkyl group, a lower alkanoyloxy-substituted lower alkyl group, a lower alkoxy carbonyl group, or a lower alkoxy carbonyloxy-substituted lower alkyl group; and R^4 is a group of the formula:

10



(in which A , R^5 and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenyl carbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: $-O-A_4-CO-NR^{40}R^{41}$ (in which A_4 is a lower alkylene group, R^{40} and R^{41} are the same or different and each hydrogen atom or a lower alkyl group, or R^{40} and R^{41} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; an alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which

15

20

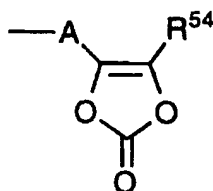
25

30

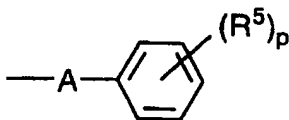
- 488 -

A₅ is a lower alkylene group, R⁴² and R⁴³ combine together to form a group of the formula: =O, or =N-OH or a lower alkylendioxy group, and R⁴⁴ is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); or a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring, or a salt thereof.

24. A quinoxaline derivative according to claim 9, wherein R³ is a phenyl-lower alkoxycarbonyl group; a lower alkanoyl group; a lower alkoxy - lower alkyl group; a phenoxycarbonyl group; a lower alkanoyl-substituted lower alkyl group; a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; a group of the formula: -E-N(R⁵²)(R⁵³) (in which R⁵² and R⁵³ are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxycarbonyl group or phenyl group, or R⁵² and R⁵³ may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: -CO-, or a group of the formula: -CO-A- (in which A is a lower alkylene group)); or a group of the formula:



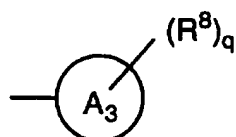
(in which R⁵⁴ is hydrogen atom or a lower alkyl group and A is the same as defined above), and R⁴ is a group of the formula:

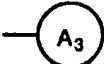


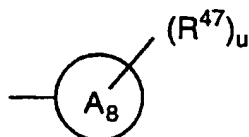
(in which A, R⁵ and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy - substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula:

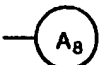
- 489 -

-O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄ is a lower alkylene group, R⁴⁰ and R⁴¹ are the same or different and each hydrogen atom or a lower alkyl group, or R⁴⁰ and R⁴¹ may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl - substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula:



(in which the group , R⁸ and q are as defined in claim 1); a group of the formula: -A₅-CR⁴²R⁴³R⁴⁴ (in which A₅ is a lower alkylene group, R⁴² and R⁴³ combine together to form a group of the formula: =O, or =N-OH or a lower alkylenedioxy group, and R⁴⁴ is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3 - dihydro-1H-indenyl ring; or a group of the formula:

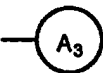


(in which the group , R⁴⁷ and u are as defined in claim 1), or a salt thereof.

25. A quinoxaline derivative according to claim 9, wherein R³ and

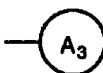
- 490 -

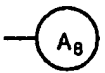
R⁴ combine together with the adjacent nitrogen atom to which they bond to form 1,2,3,4-tetrahydroisoquinolyl group, said heterocyclic group having optionally a lower alkoxy substituent, or a salt thereof.

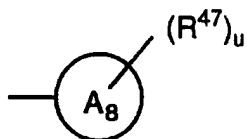
26. A quinoxaline derivative according to claim 10, wherein the saturated or unsaturated heterocyclic group in the lower alkyl group substituted by a 5- to 14-membered saturated or unsaturated heterocyclic groups represented by the group of  in the group of the formula:



is a member selected from the group consisting of benzofuryl, benzothienyl, indolyl, 2,3-dihydrobenzofuryl, perhydrobenzofuryl, quinolyl, benzimidazolyl, benzothiazolyl, imidazo[1,2-a]pyridyl, 1,4-benzodioxanyl, furo[3,2-c]pyridyl, 1,2,3,4-tetrahydrofuro[2,3-g]quinolyl, furo[2,3-g]quinolyl, 3,4-dihydrofuro[2,3-g]quinolyl, thiazolyl, pyridyl, furyl, imidazolyl, 1,2,3,4-tetrazolyl, and oxazolyl, or a salt thereof.

27. A quinoxaline derivative according to claim 26, wherein the saturated or unsaturated heterocyclic group in the lower alkyl group substituted by a 5- to 14-membered saturated or unsaturated heterocyclic groups represented by the group of  is benzofuryl or oxazolyl, or a salt thereof.

28. A quinoxaline derivative according to claim 10, wherein the saturated or unsaturated heterocyclic group in the lower alkenyl group substituted by a 5- to 14-membered saturated or unsaturated heterocyclic groups represented by the group of  in the group of the formula:

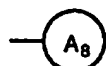


is a member selected from the group consisting of benzofuryl, benzothienyl,

- 491 -

carbostyryl, 3,4-dihydrocarbostyryl, benzothienyl, furo[3,2-c]pyridyl, furo[2,3-g] - quinolyl, 3,4-dihydrofuro[2,3-g]quinolyl, 1,2,3,4-tetrahydrofuro[2,3-g]quinolyl, naphtho[2,1-b]furyl, and oxazolyl, or a salt thereof.

29. A quinoxaline derivative according to claim 28, wherein the
 5 saturated or unsaturated heterocyclic group in the lower alkenyl group substituted by a 5- to 14-membered saturated or unsaturated heterocyclic groups represented by the group of



is benzofuryl, or a salt thereof.

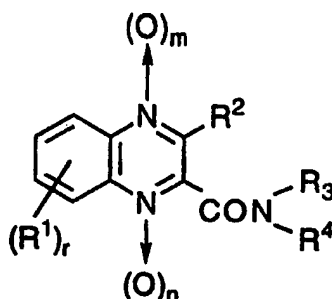
30. A quinoxaline derivative according to claim 1, which is a member selected from the group consisting of 2-[3-(benzofuran-2-yl)-2 -
 10 butenylaminocarbonyl]-3-methylquinoxalin-4-oxide, 2-[(3-methyl-7-trifluoro - methylbenzofuran-2-yl)methylaminocarbonyl]-3-methylquinoxalin-4-oxide, 2 - [(2-phenyl-5-methyloxazol-4-yl)methylaminocarbonyl]-3-methylquinoxalin-4 - oxide, 2-[[5-(2,5-dimethylthiazol-4-yl)benzofuran-3-yl]methylaminocarbonyl]-3 - methylquinoxalin-4-oxide, 2-[3-[5-(2-methyl-1,2,3,4-tetrazol-5-yl)benzofuran-2 -
 15 yl]-2-butenylaminocarbonyl]-3-methylquinoxalin-4-oxide, 2-[5-(benzofuran-2 - yl)-2,4-hexadienylaminocarbonyl]-3-methylquinoxalin-4-oxide, 2-[3-[5-(2,5 - dimethylthiazol-4-yl)benzofuran-2-yl]-2-butenylaminocarbonyl]-3-methyl - quinoxalin-4-oxide, 2-[3-[5-(thiazol-2-yl)benzofuran-2-yl]-2-butenylamino - carbonyl]-3-methylquinoxalin-4-oxide, 2-[3-(5,7-difluorobenzofuran-2-yl)-2 -
 20 butenylaminocarbonyl]-3-methylquinoxalin-4-oxide, 2-{N-[3-(benzofuran-2-yl) - 2-butenyl]-N-methoxycarbonylaminocarbonyl}-3-methylquinoxalin-4-oxide, 2 - {N-[3-(benzofuran-2-yl)-2-butenyl]-N-propanoyloxymethylaminocarbonyl}-3 - methylquinoxalin-4-oxide, 2-{N-[3-(benzofuran-3-yl)-2-butenyl]-N-acetyloxy - methylaminocarbonyl}-3-methylquinoxalin-4-oxide, 2-{N-[3-(benzofuran-2-yl)-2 -
 25 butenyl]-N-ethoxycarbonyloxymethylaminocarbonyl}-3-methylquinoxalin-4 - oxide, 2-{N-[3-methyl-7-trifluoromethylbenzofuran-2-yl)methyl]-N-acetoxy - methylaminocarbonyl}-3-methylquinoxalin-4-oxide, and 2-{N-[2-phenyl-5 - methyloxazol-4-yl)methyl]-N-acetoxymethylaminocarbonyl}-3-methylquinoxalin - 4-oxide, or a salt thereof.

31. An antidiabetic agent which comprises as an active
 30 ingredient a compound as set forth in claim 1.

- 492 -

32. An antidiabetic agent which comprises as an active ingredient a quinoxaline derivative of the formula:

5



10

wherein R^1 is hydrogen atom, a halogen atom, a lower alkyl group, a lower alkoxy group, an amino group having optionally a lower alkyl substituent, or an aminocarbonyl group having optionally a lower alkyl substituent,

R^2 is hydrogen atom, a lower alkyl group having optionally a halogen substituent, phenyl group, a morpholino-substituted lower alkyl group or an imidazolyl-substituted lower alkyl group,

15

n and m are each 0 or 1,

r is 1 or 2,

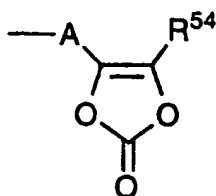
20

R^3 and R^4 are the same or different and each a) hydrogen atom; b) a lower alkyl group; c) a phenyl-lower alkoxy carbonyl group; d) a lower alkanoyloxy-substituted lower alkyl group; e) a lower alkanoyl group; f) a lower alkoxy carbonyl group; g) a lower alkoxy-lower alkyl group; h) a phenoxy - carbonyl group; i) a lower alkanoyl-substituted lower alkyl group; j) a lower alkoxy carbonyloxy-substituted lower alkyl group; k) a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; l) a group of the formula: $-E-N(R^{52})(R^{53})$ (in which R^{52} and R^{53} are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxy carbonyl group or phenyl group, or R^{52} and R^{53} may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: $-CO-$, or a group of the formula: $-CO-A-$ (in which A is a lower alkylene group)); m) a group of the formula:

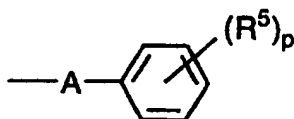
25

30

- 493 -



- 5 (in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined above); n) a group of the formula:

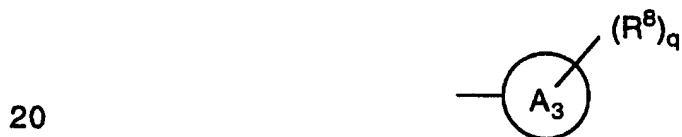


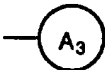
- 10 (in which A is the same as defined above, p is an integer of 1 to 3, R^5 is hydrogen atom, a lower alkoxy-substituted lower alkoxy group, a lower alkoxy group, an amino group having optionally a lower alkyl substituent, a halogen atom, nitro group, hydroxy group, a lower alkyl group having optionally a hydroxy substituent, a lower alkenyloxy group, a carboxyl-substituted lower alkoxy group, a lower alkoxycarbonyl-substituted lower alkoxy group, a lower alkoxycarbonyl group, a halogen-substituted lower alkoxy group, a hydroxy -
- 15 substituted lower alkoxy group, a phenyl-lower alkoxy group having optionally a substituent selected from a lower alkyl group and a lower alkoxy group on the phenyl moiety, a 1,3-dioxolanyl group having optionally a lower alkyl
- 20 substituent, a lower alkanoyl group, a morpholino-substituted lower alkoxy group, a morpholino-substituted lower alkyl group, a morpholinocarbonyl group or a group of the formula: $-Y-A_1-CONR^6R^7$ (in which A_1 is a lower alkylene group, Y is a group of the formula: $-O-$ or a group of the formula: $-NH-$, R^6 and R^7 are the same or different and each hydrogen atom, a lower alkyl group
- 25 having optionally a hydroxy substituent, a phenyl-lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, a furyl-substituted lower alkyl group, or a lower alkoxy-substituted lower alkyl group, or R^6 and R^7 may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being
- 30 intervened with nitrogen atom or oxygen atom, said heterocyclic group having optionally 1 to 3 substituents selected from hydroxy group, a lower alkyl group and a phenyl-lower alkyl group)); o) a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an

- 494 -

amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy-substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula:

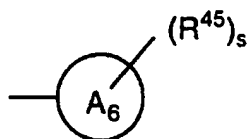
- 5 -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄ is a lower alkylene group, R⁴⁰ and R⁴¹ are the same or different and each hydrogen atom or a lower alkyl group, or R⁴⁰ and R⁴¹ may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; p) an alkenyl group; q) a cycloalkyl-lower alkyl group; r) a naphthyl-lower alkyl group; s) a phenylthio-substituted lower alkyl group having optionally a lower alkoxy-substituent on the phenyl moiety; t) a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; u) a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; v) a phenoxy-substituted lower alkyl group; w) a group of the formula:

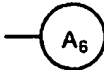


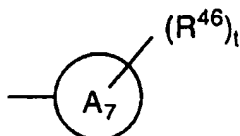
- (in which q is an integer of 1 to 3, a group of the formula:  is a lower alkyl group substituted by a 5- to 14-membered saturated or unsaturated heteromonocyclic, heterobicyclic or heterotricyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R⁸ substitutes on the above heterocyclic group, and is hydrogen atom, oxo group, a lower alkyl group having optionally a hydroxy substituent, a halogen atom, nitro group, a lower alkoxy group, cyano group, a lower alkoxy carbonyl group, a phenyl-lower alkoxy group having optionally an amino group having optionally a lower alkanoyl substituent on the phenyl moiety, a carboxyl -
- 25 substituted lower alkoxy group, carboxyl group, a lower alkoxy carbonyl -
- 30 substituted lower alkoxy group, hydroxy group, a lower alkoxy-substituted lower

- 495 -

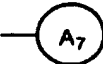
alkoxy group, a lower alkenyloxy group, a lower alkanoyloxy-substituted lower alkyl group, a halogen-substituted lower alkyl group, a lower alkanoyl group, a phenyl group having optionally a substituent selected from a lower alkyl group, a lower alkoxy-substituted lower alkoxy group, hydroxy group, a halogen atom and a lower alkoxy group on the phenyl moiety, a lower alkenyl group, a morpholinocarbonyl-lower alkoxy group, a lower alkylsulfinyl group, an amino-substituted lower alkyl group having optionally a substituent selected from a lower alkylsulfonyl group and a lower alkanoyl group, a lower alkylthio group, a lower alkylsulfonyl group, a lower alkanoyloxy group, a 1,3-dioxolanyl-substituted lower alkyl group having optionally a lower alkyl substituent, a lower alkanoyl-substituted lower alkyl group, an aminocarbonyl-substituted lower alkyl group having optionally a lower alkyl substituent, a lower alkoxy-carbonyl-substituted lower alkenyl group, an aminocarbonyl-substituted lower alkenyl group having optionally a lower alkyl substituent, a carboxyl-substituted lower alkenyl group, benzoyl group, a lower alkoxy-lower alkyl group, a group of the formula:



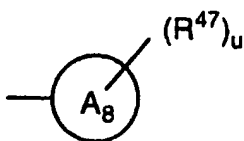
(in which s is an integer of 1 to 3, a group of the formula:  is a 5- to 6-membered saturated or unsaturated heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R^{45} bonds to said heterocyclic group and is hydrogen atom, a lower alkyl group, a lower alkoxy-substituted lower alkyl group, phenyl group or oxo group), a group of the formula:




- 496 -

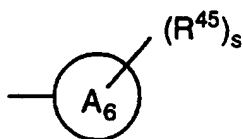
(in which t is an integer of 1 to 3, a group of the formula:  is a lower alkyl group substituted by a 5- to 6-membered saturated or unsaturated heterocyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R^{46} bonds to said heterocyclic group and is hydrogen atom, a lower alkyl group or oxo group), or a group of the formula: $-(C=O)_lNR^9R^{10}$ (in which l is 0 or 1, R^9 and R^{10} are the same or different and each hydrogen atom, a lower alkanoyl group, a lower alkyl group, a morpholinocarbonyl-lower alkyl group, a cycloalkylcarbonyl group, a phenyl-lower alkenylcarbonyl group, a lower alkylsulfonyl group, an aminocarbonyl group having optionally a lower alkyl substituent, a phenylsulfonyl group having optionally a lower alkyl substituent on the phenyl moiety, a phenyl-lower alkenyl group, a benzoyl group having optionally 1 to 3 substituents selected from a halogen atom, a lower alkoxy group, an amino group having optionally a lower alkanoyl substituent and hydroxy group on the phenyl moiety, an amino-substituted lower alkanoyl group having optionally a lower alkanoyl substituent, an amino-substituted sulfonyl group having optionally a lower alkyl substituent, a phenyl-lower alkyl group, phenyl group, or an amino group having optionally a lower alkanoyl substituent, or R^9 and R^{10} may combine together with the adjacent nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom)); x) a group of the formula: $-A_5-CR^{42}R^{43}R^{44}$ (in which A_5 is a lower alkylene group, R^{42} and R^{43} combine together to form a group of the formula: $=O$, or $=N-OH$ or a lower alkylendioxy group, and R^{44} is a phenyl group having optionally a lower alkoxy substituent on the phenyl moiety); y) a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring; or z) a group of the formula:

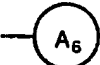
30



- 497 -

(in which u is an integer of 1 to 3, a group of the formula:  is a lower alkenyl group substituted by a 5- to 14-membered saturated or unsaturated, heteromonocyclic, heterobicyclic or heterotricyclic group having 1 to 4 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, R⁴⁷ bonds on said heterocyclic group and is hydrogen atom, a halogen-substituted lower alkyl group, oxo group, a halogen atom, a lower alkoxy group, a lower alkyl group, a lower alkoxycarbonyl group, carboxyl group, an aminocarbonyl group having optionally a lower alkyl substituent, an amino group having optionally a lower alkanoyl substituent, a phenyl group having optionally a substituent selected from a lower alkoxy group and a halogen atom on the phenyl moiety, or a group of the formula:



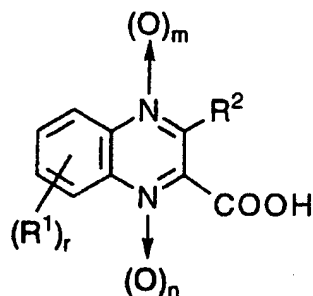
(in which a group of the formula: , R⁴⁵ and s are the same as defined above)),

or R³ and R⁴ may combine together with the adjacent nitrogen atom to which they bond to form 1,2,3,4-tetrahydroisoquinolyl group, said heterocyclic group having optionally a lower alkoxy substituent,

or a pharmaceutically acceptable salt thereof.

33. A process for preparing a quinoxaline derivative as set forth in claim 1, which comprises

(a) reacting a quinoxaline compound of the formula:



(2)

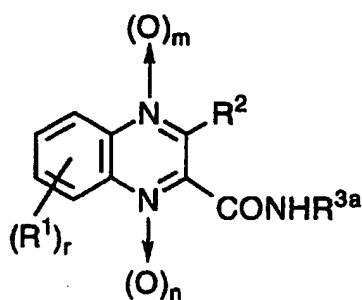
- 498 -

(wherein R^1 , R^2 , m , n , and r are as defined in claim 1) or a reactive derivative thereof with an amine of the formula: HNR^3R^4 (wherein R^3 and R^4 are as defined in claim 1),

(b) reacting a quinoxaline compound of the formula:

5

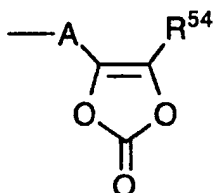
10



(1a)

(wherein R^{3a} is hydrogen atom; a lower alkyl group; a phenyl-lower alkoxy carbonyl group; a lower alkanoyloxy-substituted lower alkyl group; a lower alkanoyl group; a lower alkoxy carbonyl group; a lower alkoxy-lower alkyl group; a phenoxy carbonyl group; a lower alkanoyl-substituted lower alkyl group; a lower alkoxy carbonyloxy-substituted lower alkyl group; a benzoyl-substituted lower alkyl group having optionally a halogen substituent on the phenyl ring; a group of the formula: $-\text{E}-\text{N}(\text{R}^{52})(\text{R}^{53})$ (in which R^{52} and R^{53} are the same or different and each hydrogen atom, a lower alkyl group, a lower alkoxy carbonyl group or phenyl group, or R^{52} and R^{53} may combine together with the nitrogen atom to which they bond to form a 5- or 6-membered saturated heterocyclic group with or without being intervened with another nitrogen atom or oxygen atom, E is a lower alkylene group, a group of the formula: $-\text{CO}-$, or a group of the formula: $-\text{CO}-\text{A}-$ (in which A is a lower alkylene group)); a group of the formula:

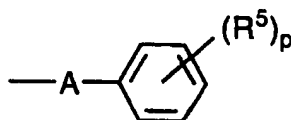
30



(in which R^{54} is hydrogen atom or a lower alkyl group and A is the same as defined

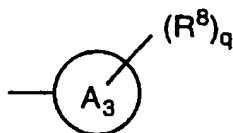
- 499 -

above); a group of the formula:



- 5 (wherein A, R⁵ and p are as defined in claim 1); a phenyl-lower alkenyl group having optionally a substituent selected from a lower alkoxy group, a halogen atom, an amino group having optionally a substituent selected from a lower alkanoyl group and a phenyl-lower alkenylcarbonyl group, a lower alkoxy -
- 10 substituted lower alkoxy group, a tetrazolyl group having optionally a lower alkyl substituent on the tetrazole moiety, hydroxy group, a group of the formula: -O-A₄-CO-NR⁴⁰R⁴¹ (in which A₄, R⁴⁰ and R⁴¹ are as defined in claim 1), a lower alkenyloxy group, nitro group and a lower alkyl group having optionally a halogen substituent on the phenyl moiety; an alkenyl group; a cycloalkyl-lower alkyl group; a naphthyl-lower alkyl group; a phenylthio-substituted lower alkyl-
- 15 group having optionally a lower alkoxy-substituent on the phenyl moiety; a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety; a phenoxy - substituted lower alkyl group; a group of the formula:

20

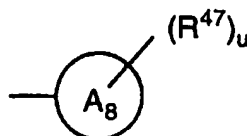


(in which , R⁸ and q are as defined in claim 1); a group of the formula:

25

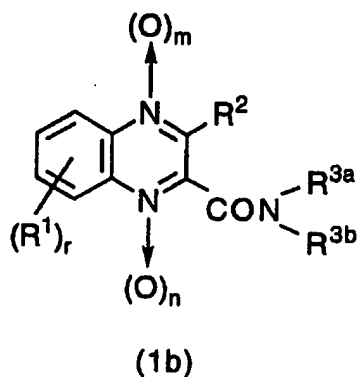
-A₅-CR⁴²R⁴³R⁴⁴ (in which A₅, R⁴², R⁴³, and R⁴⁴ are as defined in claim 1); a 2,3-dihydro-1H-indenyl-substituted lower alkyl group having optionally a substituent selected from oxo group, hydroxy group and a silyloxy group having a lower alkyl substituent on the 2,3-dihydro-1H-indenyl ring; or a group of the formula:

30



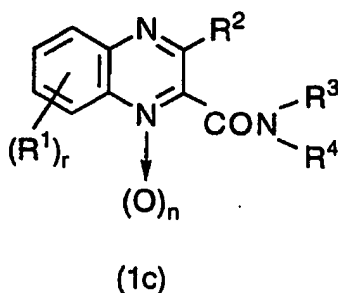
- 500 -

(in which $\text{---}\text{A}_8$, R^{47} and u are as defined in claim 1), and R^1 , R^2 , m , n , and r are as defined in claim 1) with a compound of the formula: R^{3b}X or $\text{R}^{3c}\text{COR}^{3d}$ (wherein R^{3b} is the same as R^{3a} other than hydrogen atom, and R^{3c} and R^{3d} are each hydrogen atom or a lower alkyl group), to give a quinoxaline compound of the formula:

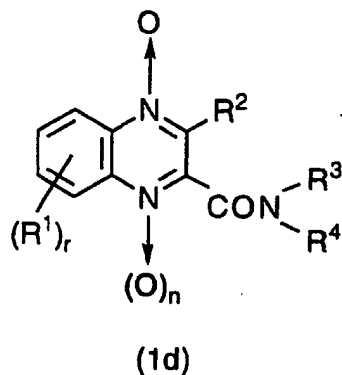


(wherein R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} and R^{3b} are as defined above),

c) oxidizing a quinoxaline compound of the formula:



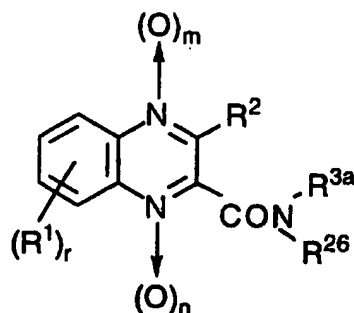
(wherein R^1 , R^2 , R^3 , R^4 , n , and r are as defined in claim 1) with an oxidizing agent to convert into a compound of the formula:



- 501 -

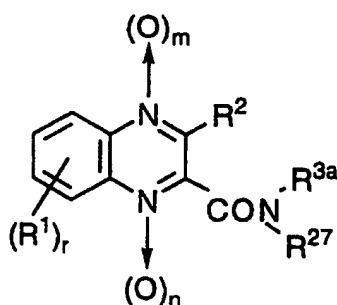
(wherein R^1 , R^2 , R^3 , R^4 , n , and r are as defined in claim 1),

d) oxidizing a quinoxaline compound of the formula:



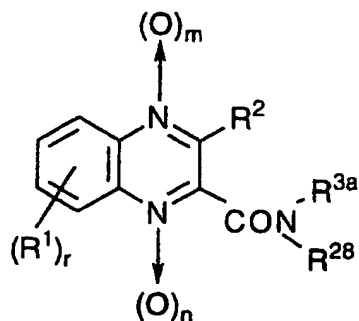
(1N)

(wherein R^{26} is a phenylthio-substituted lower alkoxy group having optionally a lower alkoxy substituent on the phenyl moiety, R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} is as defined above) with an oxidizing agent to convert into a compound of the formula:



(1O)

(wherein R^{27} is a phenylsulfinyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} is as defined above), and further to convert into a compound of the formula:



(1P)

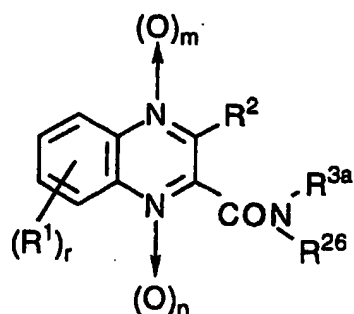
- 502 -

(wherein R^{28} is a phenylsulfonyl-substituted lower alkyl group having optionally a lower alkoxy substituent on the phenyl moiety, R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} is as defined above),

e) oxidizing a quinoxaline compound of the formula:

5

10

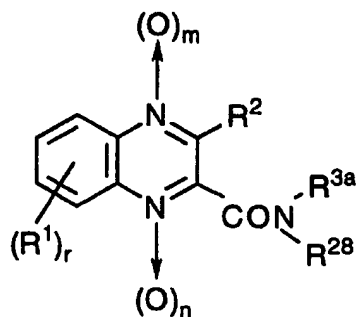


(1N)

(wherein R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} and R^{26} are as defined above) with an oxidizing agent to convert into a compound of the formula:

15

20



(1P)

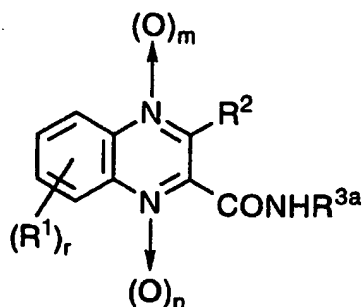
(wherein R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} and R^{28} are as defined above), or

25

f) reacting a quinoxaline compound of the formula:

- 503 -

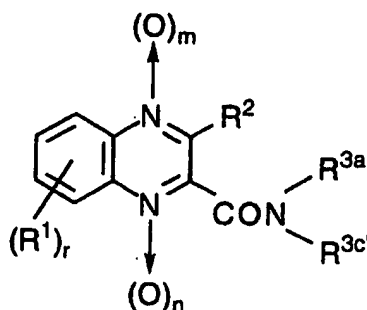
5



(1a)

10 (wherein R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} is as defined above) with a compound of the formula: $R^{3c}OH$ (in which R^{3c} is as defined above) to give a compound of the formula:

15



(1Y)

20 (wherein R^1 , R^2 , m , n , and r are as defined in claim 1, and R^{3a} is as defined above, and $R^{3c'}$ is a phenyl-lower alkoxy carbonyl group, a lower alkanoyl group, a lower alkoxy carbonyl group, a phenoxy carbonyl group, or a group of the formula: $-CO-A-NR^{52}R^{53}$ (in which A , R^{52} , R^{53} are the same as defined above).

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 94/01559

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C07D241/52 C07D241/44 C07D405/12 C07D417/12 C07D401/12
C07D403/12 C07D413/12 A61K31/495

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HETEROCYCLES, vol.26, no.3, 1987, TOKYO pages 699 - 710 S.SABRI ET AL. 'SYNTHESIS AND SPECTROSCOPIC STUDIES ON SOME NEW SUBSTITUTED 2-QUINOXALINES CARBOXAMIDES.' cited in the application see page 702 - page 710 ---	1-6
X	JOURNAL OF CHEMICAL AND ENGINEERING DATA, vol.29, no.2, 1984, USA pages 229 - 231 S.SABRI 'SYNTHESIS AND ANTIBACTERIAL ACTIVITY OF SOME NEW N-(3-METHYL-2-QUINOXALOYL)AMINO ALCOHOLS AND AMINE 1,4-DIOXIDES.' cited in the application see page 229 - page 231 ---	1,31,33
-/--		



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

20 December 1994

Date of mailing of the international search report

29. 12. 94

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+ 31-70) 340-3016

Authorized officer

Francois, J

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 94/01559

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR,A,2 085 759 (C.ERBA) 31 December 1971 cited in the application see claims ---	1,31
A	FR,A,2 137 931 (CIBA-GEIGY) 29 December 1972 cited in the application see the whole document ---	1,31
A	FR,A,2 182 957 (PFIZER) 14 December 1973 see claims ---	1,31
A	FR,M,3 717 (RHONE-POULENC) 29 November 1965 see page 1 - page 3 -----	1,31

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 94/01559

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A-2085759	31-12-71	BE-A- 764998	30-09-71
		CA-A- 957687	12-11-74
		DE-A- 2114629	21-10-71
		GB-A- 1289240	13-09-72
		US-A- 3819633	25-06-74

FR-A-2137931	29-12-72	AU-A- 4227272	22-11-73
		BE-A- 783515	16-11-72
		DE-A- 2222654	30-11-72
		NL-A- 7206601	21-11-72

FR-A-2182957	14-12-73	AT-B- 333767	10-12-76
		BE-A- 797983	10-10-73
		CA-A- 1002047	21-12-76
		CH-A- 568988	14-11-75
		CH-A- 568307	31-10-75
		DE-A- 2316765	15-11-73
		GB-A- 1432443	14-04-76
		JP-C- 1136329	28-02-83
		JP-A- 49024980	05-03-74
		JP-B- 57026275	03-06-82
		NL-A- 7305048	05-11-73
		SE-B- 405853	08-01-79

FR-M-3717	NONE		
